MAY

Farm Chemicals

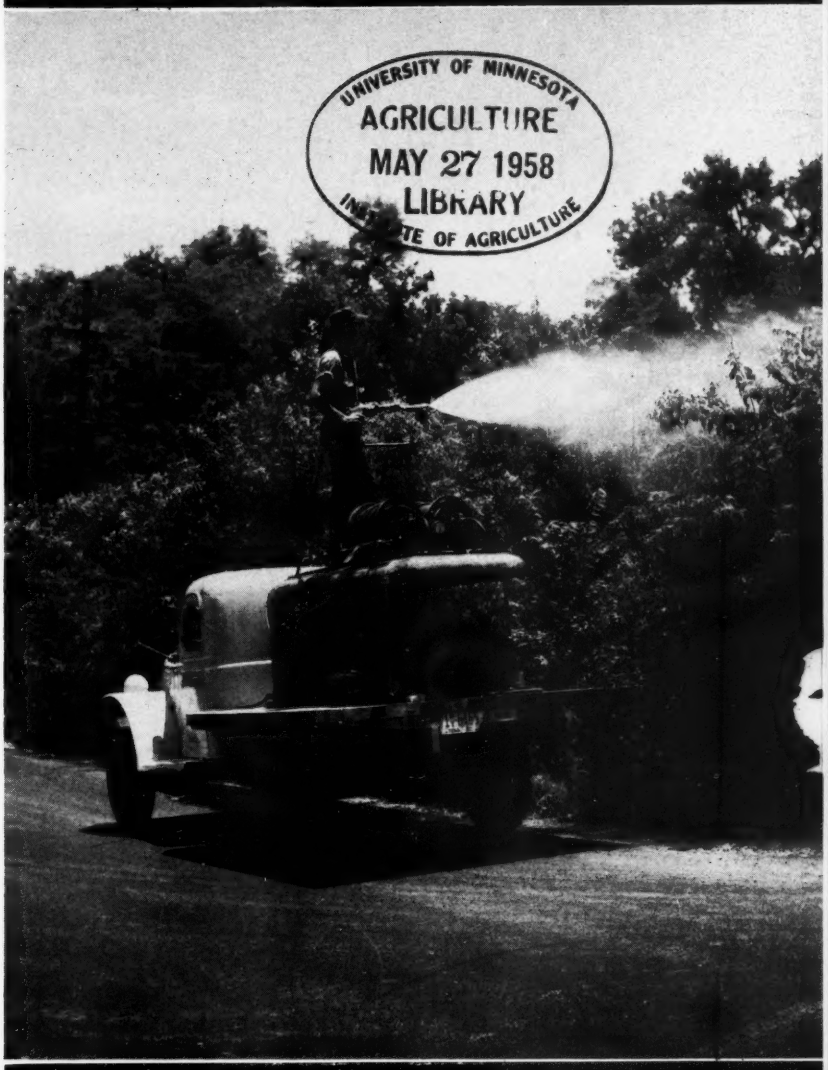
Highway Roadside Spraying 11

Magnesium Deficiency and Fertilizer 20

Weed Control Pays On Rangeland 23

TVA Developments In 140 Plants 27

What Influences Fertilizer Buying . . . 28



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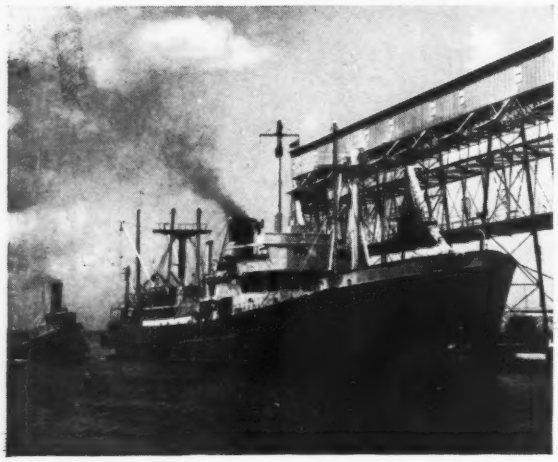

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PHOSPHATE MINERALS DIVISION..... .....20 N. WACKER DRIVE, CHICAGO 6

PHOSPHATE MINES AND PLANTS IN FLORIDA AT NORALYN, PEACE VALLEY, ACHAN, MULBERRY; IN TENNESSEE AT MT. PLEASANT. WALES AND GODWIN

HEPTACHLOR

is "planting" more sales support than ever before!

COMPREHENSIVE DEALER PROGRAM! In 1958, Heptachlor is being backed by the most comprehensive merchandising campaign ever developed to promote insecticide sales. There is a complete Insecticide Dealer Program that includes a "Salesmen's Insect Control Refresher Course"; a monthly information service; free listing in Velsicol's local advertising; listing in a "sources of supply" bulletin; and Insect Control Guide Sheets.

COUNTY AGENT PROGRAM! A special program, called the "Heptachlor Insect Control Forum," is being conducted for agricultural leaders. This program includes a monthly information service, insect control guide sheets, and the special consultant services of Velsicol Entomologists.

MORE THAN 20 REGIONAL MERCHANDISING PROGRAMS! More than 20 separate regional merchandising programs are promoting the use of Heptachlor in all parts of the country. Each of these programs includes advertising, dealer support, and promotional materials. Each is designed for specific crops and insects, and timed to coincide with local recommendations for the use of Heptachlor. Here is a list of these programs:

WEST	SOUTH	CENTRAL
Alfalfa Weevils	Cotton Insects	Soil Insects
Soil Insects	Tobacco Insects	Forage Insects
Grasshoppers	Peanut Insects	Bluegrass Bugs
	Soil Insects, Corn	Tobacco Insects
EAST	Soil Insects, Potatoes	Sweet Clover Weevils
Forage Insects	Soil Insects, Nursery Stock	Grasshoppers
Soil Insects	Soil Insects, Truck Crops	
European Chafers	Rough Headed Corn Stalk Beetles	
	Sweet Potato Weevils	
	Sugar Cane Insects	

HEPTACHLOR VERSATILITY! Heptachlor is used wherever crops are grown, because of its effectiveness and versatility. It is America's leading soil insecticide, and can also be used on forage crops without danger of milk or meat contamination. Heptachlor controls more than 75 soil and leaf feeding insects on all major crops, and is safe, easy, and economical to use!

FOR BIGGER INSECTICIDE SALES IN 1958, PUSH HEPTACHLOR

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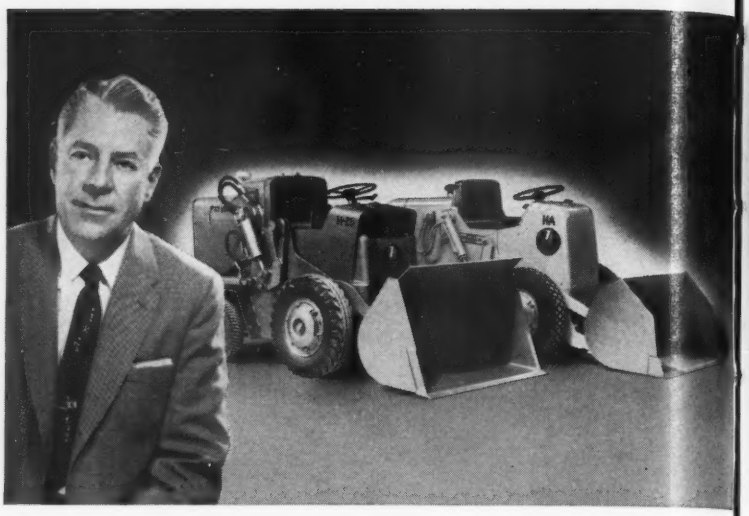
330 East Grand Ave., Chicago 11, Illinois

International Representative: Velsicol International Corporation, C.A. • P. O. Box 1687 • Nassau, Bahamas, B.W.I.

Report on the All-New Model H-25 **PAYLOADER**®

by G. A. Gilbertson,
President of The Frank G. Hough Co.



Recently I had the pleasure of personally delivering the 10,000th production model HA "PAYLOADER" to our distributor in the metropolitan Chicago area.

Because our company pioneered the first unit-designed, rubber-tired front-end loader and because this quantity of 10,000 of a single model is more than all other manufacturers combined have produced, we were justifiably proud of our accomplishment and the acceptance of our product by industry.

Inasmuch as we anticipate a continued demand for this model HA, we plan to continue its production, even though we are now introducing a completely new machine, the model H-25.

More "Payloader" Pioneering

This new H-25 "PAYLOADER" is in a class by itself as far as capacity, productive ability and features are concerned. It is a quality machine in *every* sense of the word.

While it will be priced higher than the model HA, and units competitive to that model, it will be a profitable investment, since it can handle materials at a *lower cost per yard* and that, in the final analysis, is *most important* to the user.

In this connection, your Hough Distributor has available the broadest and most complete set of financing plans offered: time payment and leasing plans, with or without option to purchase . . . any and all kinds of financing to best fit your needs.

What is so different about the new H-25?

More Capacity and Maneuverability

In terms of capacity alone, it is in a class by itself . . . the only machine with a *carry capacity* of 2,500 lbs., at average operating speeds of 4 m.p.h.

With a bigger and heavier unit having more capacity, it would be logical to expect you would need more room to operate. On the contrary, not only can this new H-25 negotiate 6-foot box car doors with ease . . . it actually has a turning radius (measured to the outside rear hub) which is LESS than ANY other rubber-tired tractor-shovel.

How Important is Carry Capacity?

How much a loader can handle and move depends on the *carry capacity* . . . not on the static lifting capacity. The proper size of the bucket for any loader depends on the *average weight* of the material to be handled *in relation* to the machine's *carry capacity.*

Thus, with the H-25 "PAYLOADER" if you want to handle the maximum load of material weighing 125 lbs. per cubic foot, you can use a bucket with an S.A.E. rated capacity of 20 cu. ft. and move loads of 2,500 lbs., which is the carry capacity of the unit.

If you consistently handle heavier materials, you should use a smaller bucket or if you handle nothing but lighter loads, you can use a bigger bucket. The *important* thing is to stay within the recommended carry capacity.

The H-25 Has Extra "built-in" Strength

Regardless of its size and recommended capacity, some operators will always push equipment to extremes. This abuse will inevitably result in extra maintenance and even failure. That is why we have engineered extra strength and stamina throughout the H-25 . . . for your protection.

What About Individual Features?

There are dozens of them! The new power-shift transmission and a new torque-converter are matched

to give the ultimate in speed and ease of operation. The H-25 has a two-speed, full-reversing transmission. Power-steering adds to handling ease.

This new "PAYLOADER" is equipped with sealed, self-adjusting brakes and is the only unit of this class offering this important feature.

The H-25 has a maximum dumping height that is 6½ inches higher than the average of other loaders now being offered in this general capacity range.

This new unit is powered by a 44 HP gasoline engine with overhead valves for better performance and wet sleeves for easier maintenance. LPG (liquified petroleum gas) and diesel power are available.

Dig-ability?

When it comes to digging power, the H-25 gives you 4,500 lbs. of breakout force and, like other "PAYLOADER" front-end loaders, provides a bucket tip-back of 40 degrees, ***at ground level!*** As the bucket raises, a further tip-back to 65 degrees helps retain maximum loads.

Protective Features

If you are concerned with dust and dirt like most chemical, fertilizer and foundry operators are, you will appreciate the extra protective features engineered into the H-25. For example, the engine is afforded maximum protection with triple air cleaners — a precleaner and dual oil-bath air cleaners.

This "PAYLOADER" has a filtered hydraulic system. The oil reservoir is a closed, pressure-control type, electrically welded.

The sealing of the majority of all pivot points reduces maintenance. Transmission and torque-converter oil is cooled by the engine radiator cooling system.

Other Features

This new H-25 is equipped with high-traction differential which automatically transfers more torque to the drive wheel with the best footing when slippage is encountered.

The fuel tank has sufficient capacity for eight full hours of operation, thereby eliminating the need for refueling during any shift.

The H-25 is equipped with a 12-volt electrical system. In addition to the usual standard equipment that includes fuel gage, oil-pressure gage and engine temperature gage, there is also a torque-converter temperature gage and an Hourmeter.

There are many, many more features which we think you will be interested in. The many interchangeable attachments now available for the model HA "PAYLOADER" can also be used on the new H-25. Contact your "PAYLOADER" distributor or write us direct for literature and specifications. The Frank G. Hough Co., 765 Sunnyside Ave., Libertyville, Ill.

5-A-1

Modern Materials Handling Equipment
THE FRANK G. HOUGH CO.
704 SUNNYSIDE AVE., LIBERTYVILLE, ILLINOIS
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

The H-25 "PAYLOADER" will be shown at both the FOUNDRY SHOW in Cleveland, May 19-23 and the NATIONAL MATERIALS HANDLING SHOW also in Cleveland, June 9-12, 1958.

Farm Chemicals — Vol. 121 No. 5 May 1958
PIONEER JOURNAL OF THE INDUSTRY

FEATURES

Highway Roadside Spraying 11
Lime May Reduce Danger of Soil Radioactivity 18
Magnesium Deficiency 20
Profits from Weed Control on Grazing Land 23
TVA Developments in 140 Plants 27
USDA Accepts Simazine Label for Corn 27
What Media Influence Fertilizer Buying 28
New Safety Identification Tag for Ag Pilots 28

INDUSTRY NEWS

Business & Management ... 30
Calendar 40
People 36
Government 39
Associations & Meetings 40

DEPARTMENTS

Viewing Washington On Agriculture 7
Reader Service 45
Equipment & Supplies 47
Suppliers Briefs 50
Production 51
Chemicals 52
Pest Reports 55
Patent Reviews 56
Dr. Melvin Nord
Fertilizer Materials Market 57
Buyers' Guide 59

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IN THIS ISSUE

▶ Contamination of food crops by radioactive fallout may be reduced by adding lime to the soil, according to Dr. Eric B. Fowler, chief chemist of the Los Alamos Scientific Laboratory, who has reported that plants grown on soil high in calcium contain less strontium-90 than those on a low-calcium soil . . . **page 18**

▶ Recent heavy rains are likely to cause a "serious magnesium problem during the coming growing season," says Dr. Jackson B. Hester, who discusses soil magnesium deficiency and describes some sources of readily soluble magnesium . . . **page 20**

▶ Dayton L. Klingman, USDA research agronomist, has done some sound estimating of profits ranchers and farmers can realize by controlling weeds on their rangelands and pastures. He says, "Partial control of brush . . . has resulted in three to eight times as much forage as grown on comparable untreated sites . . ." **page 23**

▶ Geigy Simazine, after showing great promise in field trials as a preemergence herbicide for corn, has been accepted by USDA for that use . . . **page 27**

▶ In a study conducted for Nitrogen Div., Allied Chemical Corp., most farmers said that farm magazines gave them more helpful information on fertilization practices and recommendations than did their state farm paper, radio, newspaper, or television . . . **page 28**

COVER PICTURE

A roadside spraying scene illustrates part of the expanding highway market for farm chemicals. This sprayer has been especially adapted for highway spraying and brush control.

How well does TREBO-PHOS* ammoniate?

First commercial runs with Cyanamid's new Triple Superphosphate indicate:

1. Ammoniation easily achieved up to 4.6% and higher with suitable equipment.

2. Even at rates over 5%, no uncomfortable ammonia fumes were evolved under optimum conditions.

3. The ability of TREBO-PHOS to ammoniate at high rates means manufacturers may choose from a wide range of nitrogen carriers.

4. Early indications are that the physical condition of TREBO-PHOS makes possible *complete* and *uniform* absorption of ammonia. A well conditioned mixed fertilizer which is dry and drillable should be the result.

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American Cyanamid Company, Phosphates Department
30 Rockefeller Plaza, New York 20, New York

THE MAN WITH THE MULTIWALL PLAN

UNION PACKAGING SPECIALIST BOB BUCK

lowers customer's bag costs $35,000 annually

A little weight reduction can go a long way in trimming Multiwall costs. Union Packaging Specialist Bob Buck demonstrated just how far during a study of one company's bagging operation.

The company had been using a baler bag of 160# total basis weight. Union's analysis proved that a 70/70 bag would be equally effective. The 20# reduction resulted in a savings of $35,000 a year.

This economy came through Union's 5-Star Packaging Efficiency Plan. Among the other improvements were: (1) A new, revised specifications manual which simplifies and streamlines inventory control. (2) Standardization of all bag printing. This assures delivery of completely uniform print copy from the firm's various suppliers.

Union Multiwall Recommendations are based on this 5-Star Packaging Efficiency Plan

- DESIGN
- EQUIPMENT
- CONSTRUCTION
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- PLANT SURVEY

Union's plan is producing thousands of dollars worth of savings for Multiwall users, large and small. It might point the way to a greater return on your packaging investment. Write for details.

Better Multiwall performance through better planning

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UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

UNION MULTIWALL BAGS

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233 BROADWAY, NEW YORK 7, N. Y.

VIEWING WASHINGTON

with Farm Chemicals Washington Bureau

on agriculture

There now are strong signs that the 1958 business slump is at the turning point--in the view of most government economists. They believe that the recession has hit bottom, or is close to it, and that slow gradual improvement will set in during the next few months. In the last quarter, they predict, the economy will definitely be heading back up again.

"Underlying forces" suggest that consumer incomes, industrial production, employment, industrial expansion and government spending will turn up in the last few months of the year, they believe.

A new government survey of the situation says that "consumer incomes may well stabilize close to current levels with some rise later in the year." It points out that current heavy rates of industrial inventory declines are grinding to a halt. Continuation of demand at current levels, it says, is likely to bring about a reversal and force production and employment up.

The impact of recent build-ups of excess productive capacity in many industries "will likely be offset by expansion elsewhere in the economy," according to the survey.

Spendable farm income will be higher in 1958 than in 1957, The Department of Agriculture predicts. The Department economists are certain of it--forecasting that farm net earnings will be up 5 per cent to 10 per cent--or more than $1 billion from last year's $11.5 billion.

This is good news to the farm chemicals industry, particularly fertilizers. It means farmers should have roughly $1 billion more to spend than they had last year on a net basis, and perhaps several more billions on a gross basis. This is doubly significant in view of the fact that lower 1958 price supports are expected to further stimulate the farmers' quest for higher crop yields.

The USDA's report states: "This income increase will reflect somewhat higher cash receipts from marketings together with larger outlays to farmers for participation in the Soil Bank--which will be only partly offset by some increase in production expenses, notably feeder livestock and for such overhead costs as interest and taxes.

Cash receipts from farm marketings in the first quarter of 1958, at approximately 6.9 billion dollars, were up 7 per cent from the first three months of 1957. Total marketings are reported to be a little larger than last year, with prices averaging considerably higher. First-quarter livestock receipts of 4.3 billion dollars were up 12 per cent, mostly due to higher prices for meat animals, poultry, and

VIEWING WASHINGTON

agriculture continued

eggs. Crop receipts of 2.6 billion were about the same as last year, as increases in cotton, sorghum grain, and potatoes about offset declines for wheat and tobacco.

Farm production this year could worsen an already-bad farm surplus situation. USDA crop experts are privately forecasting record or near-record harvests of at least three of the major farm crops--corn, wheat, and soybeans. Planting and growing conditions over much of the country are close to ideal. The wheat crop, now beginning to come to market, is estimated at 1.2 billion bushels or higher--but USDA estimates are considered by the grain trade to be on the conservative side.

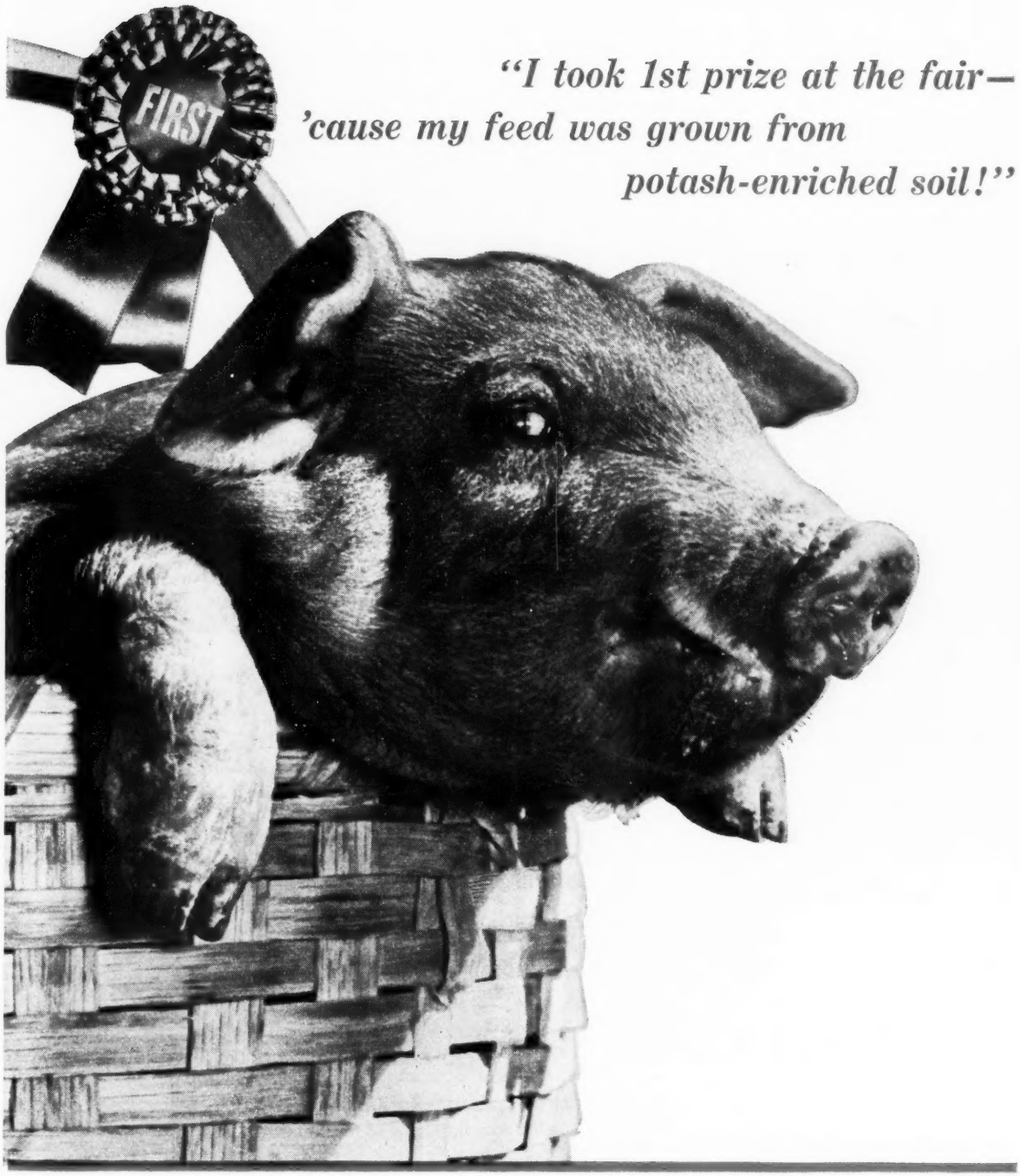
Corn production is likely to hit close to 3.5 billion bushels--just under the record 1948 crop of 3.6 billion. While corn is just going into the ground, crop experts believe that soil moisture conditions are the best in years. And with slightly higher acreages planted, an average weather-year could produce a whopper. Soybeans will "certainly" produce over 500 million bushels, the experts believe. Acreage is up about 2 million, and conditions seem excellent.

Efforts to cut down on the Agricultural Conservation Program, (ACP), apparently have failed. The Agriculture Department urged Congress to chop $125 million from the annual $250 million program. But in separate actions, the Senate and House voted to continue the program at current levels. The Senate went further, and directed that no changes be made in the program unless recommended by local USDA committees and approved by State committees--something that's not likely to happen.

The program pays farmers up to 50 per cent of the cost of installing conservation practices. One of the most popular practices under the program is applicaton of lime and fertilizer.

The chemical industry "had its best year in 1957," despite a last quarter drop. So says the Commerce Department's Business and Defense Services Administration. Sales in 1957, it reports, reached an all-time high of $23.4 billion, a gain of 2.8 per cent over 1956. This topped the level of sales for all manufacturers, which were up 2.5 per cent from 1956.

The chances for congressional approval of an omnibus farm bill now are growing dimmer. The current price trend, coupled with an optimistic farm income forecast, tend to work against any farm law changes of major importance this year. In addition, the powerful American Farm Bureau Federation has come out in opposition to major changes proposed by the House Agriculture Committee. To many observers, this seals the fate of farm legislation for the year.



"I took 1st prize at the fair—
'cause my feed was grown from
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ATTENTION FERTILIZER MANUFACTURERS: USP offers *3* outstanding grades of potash—designed to meet your highest requirements. USP's Higran, the new specially-sized white granular (62/63% K_2O), and Higrade muriate (also 62/63% K_2O)—the 2 purest agricultural muriates now available. *And* USP's Granular muriate (60% K_2O). All three are non-caking and free-flowing throughout.

Our Technical Service Department welcomes your inquiries.

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MEMBER: AMERICAN POTASH INSTITUTE

Geigy Agricultural Chemicals Announces

SIMAZINE* 50W

HERBICIDE

now released as a selective herbicide for corn

Simazine may be applied to field, seed, silage and sweet corn. Since there is no residue in corn as a result of Simazine treatment, there are no restrictions in the use of corn for human food and animal feed.

Simazine 50W is good news for corn growers. It gives effective season-long weed control. Geigy scientists feel that 100 bushel corn is now possible with little or no cultivation.

Over 400 research cooperators nationwide have tested this outstanding herbicide. Results show that the application of Simazine 50W at 4 pounds per acre, on normal soil, virtually eliminates grasses and broadleaf weeds from corn for the entire growing season.

Simazine 50W is applied at planting time as a preemergence spray. Weeds germinate but fail to grow, and die off in a few days, leaving corn unharmed.

Simazine 50W, a new kind of weed killer with a new kind of kill is available from leading agricultural chemicals distributors nationwide.

Check these SIMAZINE 50W *Safety Features*

✓ **SAFETY TO HUMANS AND ANIMALS**
Extremely low toxicity—no need for protective clothing. Non-irritating to skin.

✓ **SAFETY FROM DRIFT HAZARD**
Works through roots—little or no foliage toxicity.

✓ **SAFETY TO SPRAYING EQUIPMENT**
Non-corrosive—non-abrasive to equipment.

* "SIMAZINE" is a trademark of Geigy Chemical Corporation

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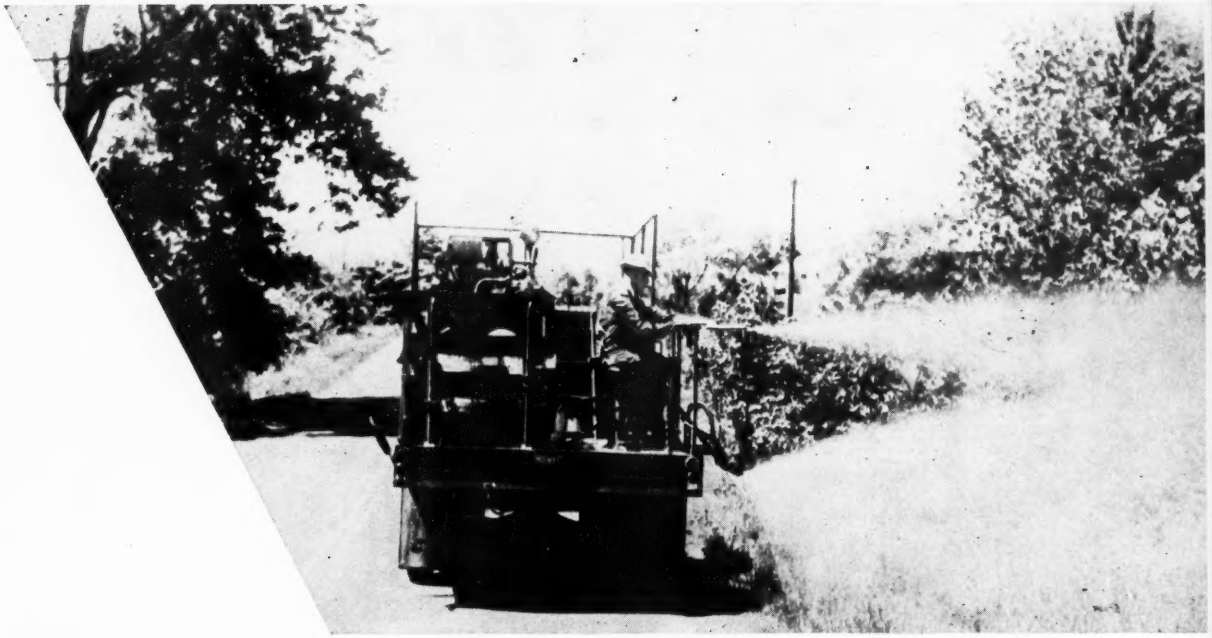


HIGHWAY ROADSIDE SPRAYING

BY HOWARD INGERSON
Product Research
John Bean Division,
Food Machinery and Chemical Corp.

Maintenance programs that include power spraying for weed and brush control are reducing costs while making our highways safer, better looking

We are in the beginning years of a rapidly expanding market for herbicides, insecticides, soil sterilants and other specialized chemicals for highway roadside weed and brush control. Needs are already indicated for additional and modified chemicals for specific requirements of this new market.

With two million acres of highway roadsides now under federal, state, county, township and municipal maintenance and another million acres being added by the federal highway program, even nominal savings per acre in maintenance costs add up to many millions of dollars.

This new market is a challenge to the spray chemical and power sprayer industries to continue to adapt their products to these requirements. They can also render real service by furnishing technical guidance in the long range planning of weed and brush control programs and in the most economical use of materials, equipment and labor.

Contract Spraying

Large scale roadside weed and brush control spraying is being done in two ways, part by contract and part directly by the highway departments. The contract work is being done by custom spray operators. These firms have fleets of truck mounted heavy duty power sprayers with the necessary accessories for rapid and economical roadside spraying. They also have spray crews who know the techniques of spraying under the wide range of conditions on each section of highway roadside. • The highway departments let the spray contracts on a seasonal basis specifying the number of applications to be made, the formulations of chemicals to be used and the approximate periods when applications shall be made on each section of roadside. Since the custom operators do other contract spraying, they can spread the overhead costs on equipment and supervision over large volumes of work and in this way do roadside spraying at very nominal per acre or per mile costs.

The highway departments may prefer to keep the work within the department—making use of trucks and supervisory personnel and giving employment to their regular local workmen. In these cases, it is necessary that both the supervisory personnel and the foreman of each spray crew become familiar with the various sprays, equipment and methods for the many conditions they will meet.

There are suitable movie films,

(Continued on page 14)

"Service gets top billing at Red Star"

says Archie Edwards
Manager, Red Star Fertilizer Division
Sulphur Springs, Texas

"And service is a mighty big reason we contract International's Triple"

In supervising Red Star activities in Texas and four surrounding states, Manager Archie Edwards backs his decisions with more than 14 years of industry experience.

Setting up field demonstrations and helping dealers arrange meetings are common activities for Dale Campbell, field service director at Red Star. Complete merchandising service includes educational material on fertilizer usage, films, printed brochures and hand-out material as well as soil and tissue testing equipment. Red Star's 5-state sales area keeps Campbell and "Super-Flo" truck busy year-round.

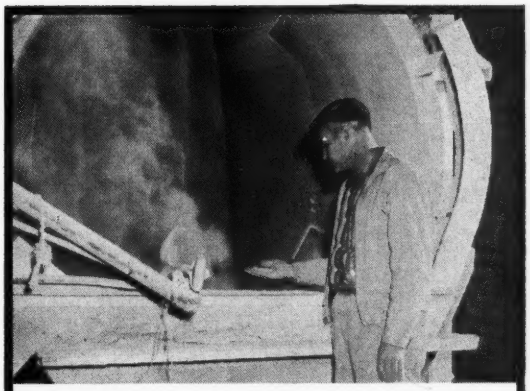
"An action-planned program of customer service put us on the road to success here at Red Star," says Archie Edwards, manager of Red Star Fertilizer Division.

Take for example, the flashy yellow "Super-Flo" service truck — a welcome and familiar sight to Red Star dealers. The truck is loaded with educational, display and merchandising material . . . all designed to help dealers boost sales of "Super-Flo" fertilizers.

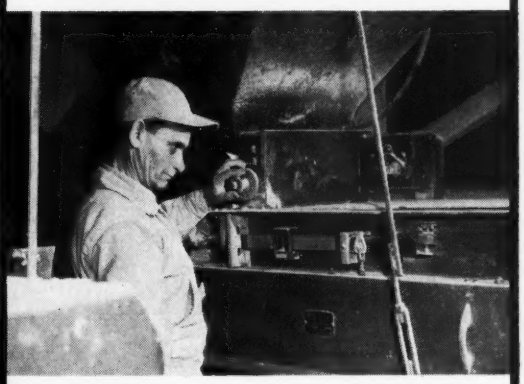
Red Star history dates to 1948, when the Sulphur Springs plant in northeastern Texas was purchased. The plant operates as the fertilizer division of Southern Farm Supply Association.

The same idea of top-quality product backed by top-flight service is one of the reasons Red Star uses International's Triple Super. Prompt delivery keeps peak season production schedules humming . . . uniform high analysis and good physical condition eliminate troublesome formulation problems.

You can benefit from International's superior quality triple and service tailored to fit your needs. Contact your International sales representative now for additional information.



"Prettiest pelleted product anywhere," says Plant Superintendent John Souter, checking pellets at the cooler. Uniform, dust-free pellets are ideal for application by airplane.



Granulation foreman Collis Gowen checks reading on one of four belt gravimetric feeders that accurately weigh and control flow of all dry fertilizer materials.

Covered loading dock and expansion belts let Red Star workers load trailers direct from baggers — rain or shine. Belts are reversible to move goods into storage area.

All mixed goods are bagged under the "Super-Flo" label in both 50- and 80-lb. bags. In addition, the Red Star line includes other basic materials and specialty products.

INTERNATIONAL MINERALS *International* MINERALS CHEMICALS **& CHEMICAL CORPORATION**

PHOSPHATE CHEMICALS DIVISION .... 20 N. WACKER DRIVE, CHICAGO 6, ILL.

Use of the Injector-type refiller permits filling the tank from any convenient source of water using the spray pump to operate the injector. No other pump or engine is required.

colored slides and other visual aids available to illustrate many of the spraying problems to be encountered, the methods of meeting each problem and the appearance of the roadsides before and after the adoption of well planned spraying programs.

Spraying Equipment for Weed and Brush Control

Power sprayers suited to heavy duty roadside service are available in two general types: skid mounted sprayers—for use on truck beds or chassis or for setting in the box of standard highway dump trucks; trailer type sprayers—for hauling by trucks or tractors. If properly selected they can be truck mounted during certain parts of the season.

The essential components of every heavy duty power sprayer are the pump, engine, tank, frame, mounting, with suitable drive connections, agitator, piping, valves and accessories. Each component should be considered carefully with weight and the overall dimensions of the complete sprayer as very important factors in this service.

The pump is the heart of every sprayer; first consideration should be given to it. There are three general types of pumps used on sprayers, commonly known as rotary, centrifugal and plunger types. *Rotary* pumps are designed for handling solutions free from solids and abrasive materials such as sand from the average surface water supply and are usually suited only to low pressures, 30 to 100 pounds, which is not adequate for effective brush control. *Centrifugal* pumps are designed for medium to high capacities but at low to medium pressures and are not economical of power.

The so-called *piston or plunger* type pumps are suited to handling all types of spray materials, solutions, suspensions, corrosive or abrasive or both and are economical of power and suited to both high and low pressures. Modern plunger type spray pumps have oil bath drive ends similar to the crankcase part of an engine. The solution end of the pump is entirely separate from the drive end and all parts coming in contact with the spray materials are resistant to corrosion and abrasion.

Enclosed pumps are available in a range of capacities from 4 to 60 gallons per minute, all suited to pressures from 30 to 400 pounds per square inch. Experience has shown that a very practical size pump delivers 20 g.p.m. This will supply sufficient nozzles or spray guns for most weed and brush spraying with the truck or tractor moving at 4 to 5 m.p.h. For state and federal highways and parkways with extra wide roadsides and where it is desirable for the sprayer to travel up to 10 m.p.h., pumps with capacities in the 35 to 60 g.p.m. capacities are required.

The engine for powering the pump should be a make on which

SPRAY MATERIALS for roadside maintenance include seven principal types, each developed for specific uses, either separately or in combination with other chemicals. In order of present volume of usage they are:

1. Hormone type selective weed killers such as 2,4-D for control of broad leafed weeds and the more easily killed brush.
2. Hormone type selective brush killers such as 2,4,5-T for foliage applications either separately or in combination with 2,4-D.
3. Hormone type brush killers such as 2,4,5-T mixed in either fuel oil or deisel oil for "basal" applications to brush.
4. Soil sterilants such as Telvar to be used where it is desirable to kill all vegetation including grass.
5. Insecticides such as Chlordane to control soil insects that destroy grass roots and allow erosion to start.
6. Insecticides such as malathion to control insects of shade trees and ornamental materials to keep them healthy and prolong their life spans.
7. Growth control chemicals such as Dalapon for use where turf should be maintained but controlled at such locations as interchanges, cloverleafs and similar traffic areas.

service is available locally and should have ample reserve of power for the highest capacity and pressure at which the sprayer will be operated. An engine with horsepower rating close to the g.p.m. of the pump will have a good reserve of power and should be trouble free.

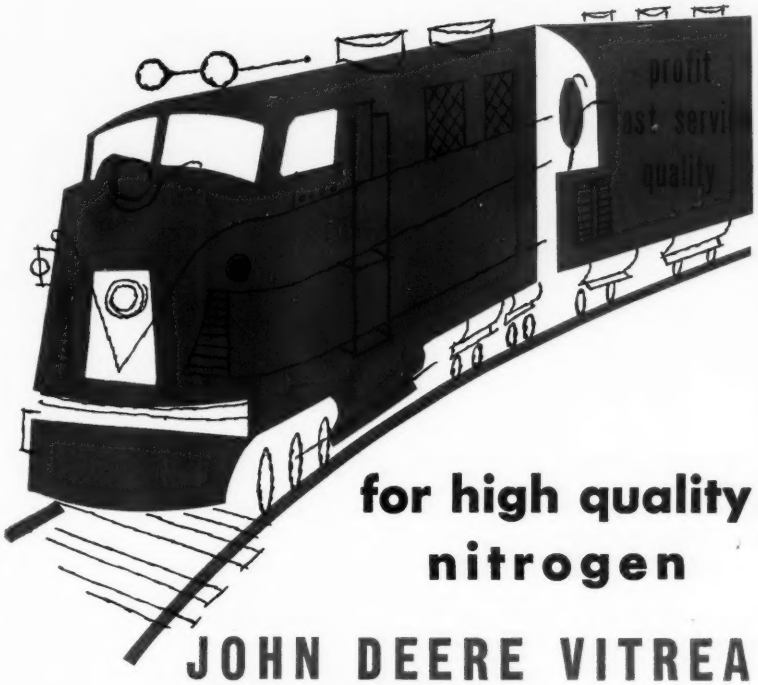
Spray tanks are regularly of welded steel construction with baffles provided in the larger sizes to reduce surging when starting and stopping the truck or tractor. Every sprayer tank should have a large filler opening equipped with a tight fitting strainer box and strong leak proof hinged cover. It should be equipped with a mechanical agitator to assure uniform and constant agitation and avoid settling of suspension type materials. Every power sprayer should have a large capacity, easily cleaned filter in the piping between the spray tank and the pump to keep trash from the water source out of pumps, valves and nozzles. The spray tank should be as large as can be handled. It is always possible to take less than a full tank load under difficult hauling conditions.

With about ten years of commercial experience in large scale highway roadside spraying the choice of equipment has quite well standardized on sprayers having 20 g.p.m. pumps, 12 to 18 h.p. engines and 1000 gallon tank capacity. These components should be assembled into a compact sprayer short enough to be mounted on a standard wheel base truck or to set directly into the box of a dump truck.

Spraying Accessories

The accessory equipment for weed and brush control is of prime importance in roadside spraying service. Fixed spray booms with hydraulically operated folding wings have been used under certain conditions, but the trend is toward the use of fixed broad pattern nozzles for the part of the roadside-adjacent to the road surface, used with adjustable type spray guns manually operated from the truck for the roadside beyond the reach of the fixed nozzle.

on the right track



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With this combination, an experienced operator can get uniform coverage of the entire roadside at travel speeds from 5 to 10 miles per hour. For brush control, hose reels are useful, mounted on the sprayer or on the truck bed, with sufficient hose to reach to the limit of the right-of-way.

A tank refiller should be a part of every highway roadside sprayer. Refillers are of the injector type, using the high pressure pump discharge to raise water from a surface supply to the sprayer tank. Refillers have a capacity range from 30 to 125 gallons per minute and are suited for raising water vertically from 16 to 18 feet. The use of a sight glass mounted to show the amount of spray in the tank will save many miles of "driving back" to a water supply.

For weed control the low pressure, broad pattern nozzles are regularly used for the first 8 to 12 feet from the edge of the road surface.

Rate of Work

The most economical type of roadside spraying seems to be accomplished with a two man crew: a driver, and the operator who directs the nozzles and spray guns.

Where the problem is only weed control and with the sprayer traveling at 5 mph, and applying 50 gallons per acre it is regular practice to spray 10 to 15 miles of roadside on both sides of the highway in an 8 hour day. The actual mileage will depend upon the width of roadside—which determines the frequency of refilling the sprayer, the number of obstructions, and density of traffic. Where both weeds and brush are to be killed and it is necessary for the spraymen to leave the truck for thick clumps of brush the mileage will be reduced accordingly.

2,4-D

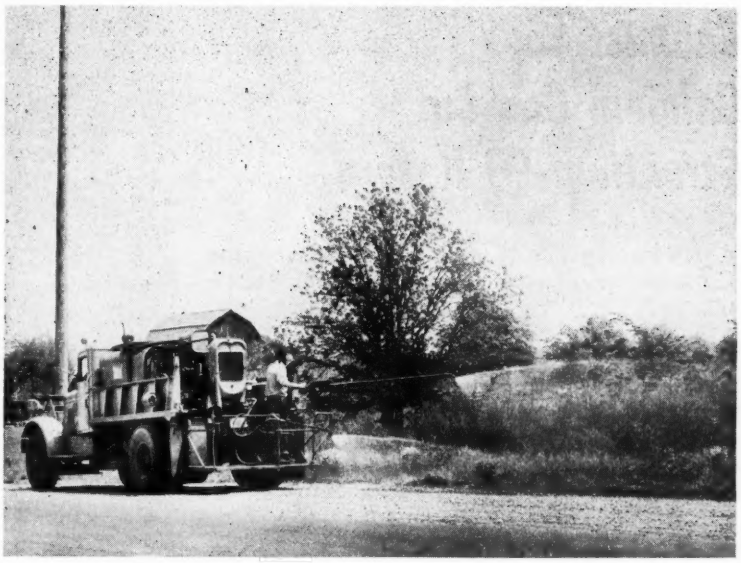
2,4-D for control of broad leafed weeds should be applied in a light overall coverage when the weeds are growing actively and leaves are well developed, using pressures of 40 to 50 pounds and

nozzles deliverying a coarse spray. The gallonage per acre will vary with the density and height of grass and weeds but should average about 50 gallons per acre. In the first one to three years of a spraying program 3 applications are usually required to bring all common weeds under control. After the second or third year, if the work has been thoroughly done, one application should be sufficient to take care of the resistant weeds and kill out the new ones.

Non-volatile forms of 2,4-D should be used and especial care taken to avoid drift where hormone sensitive farm crops or ornamental materials are in adjacent fields. This may sometimes mean selecting the areas to be sprayed in accordance with the amount of wind blowing or using other types of weed killers. Still another method usable in limited areas is for the spray operator to use his hose and spray gun and while walking on the outside edge of the right-of-way, direct the spray downward and toward the surfaced highway and away from the farm crop or trees.

Brush Control

In brush control there is more variation in spraying requirements. Judgement and experience can make the spraying effective and economical or ineffective and expensive. The material used will usually be either 2,4,5-T or a mixture of one half 2,4-D and one half 2,4,5-T. If the brush is short (less than 2 feet high) and scattered, then fixed nozzles and adjustable spray guns operated from the truck or sprayer can be used successfully. If the brush is high and in thick clumps, then the spraymen need to use lengths of hose and have the spray guns close up to each clump, to direct the spray material into the clump of brush from several different positions and place enough chemical on the foliage to assure killing the unwanted plant. Pressures of 200 to 400 pounds are required to get penetration into large clumps of brush quickly, and the spray gun should deliver large coarse droplets.



A highway sprayer mounted in a dump truck body. A platform on the rear of truck provides ample space for the operator and gun extension permits effective spraying to the limit of roadside area.

The gallonage required per acre will vary widely but usually is in the range of 100 to 300 gallons per acre. The different species of brush vary widely in their resistance to chemicals and a study of charts furnished by the chemical manufacturers and the state agricultural colleges will indicate the relative resistance. In starting a brush control program the first season's application should kill from 70 to 80 per cent of the brush. Successive seasons sprayings of the resistant species will soon bring practically all brush under control as part of the regular weed and brush applications.

"Brown Out"

Excessive browning of roadsides should be avoided whenever possible by cutting and removing large brush during the dormant season, then spraying the new sprouts to kill the roots as part of the annual weed control program. Where funds or labor are not available for this procedure and foliage spraying of large brush must be done, there is a definite need for a well planned public relations program.

It has been found desirable to explain the anticipated temporary browning of the brush in advance thru local publicity media, comparing it with other highway maintenance such as resurfacing or other road repairs, and playing up the future improved appearance and safety and the economy of the method as compared with the year after year cutting of weeds and brush.

For both local and tourist users of the highways, signs placed at the beginning of browned areas by the highway departments have been well accepted. Signs such as "This temporary browning of brush is necessary to kill it for permanent improvement of the roadside," or at intersections "This temporary brown condition of the roadside will result in future traffic safety. Thank you."

Where a roadside brush probblem exists alongside farm crops sensitive to the hormone chemicals—such as cotton, tobacco, tomatoes, grapes, etc., there are two alternate methods: 1. Delay the spraying of that section of roadside until the crop has been harvested, then if the brush is still growing actively, go ahead with the foliage spray programs. 2. If the seasons growth has ended and the leaves on the brush are tough and leathery, basal spraying during the dormant season is the practical method. In basal spraying 2,4,5-T is mixed in fuel oil or

(Continued on next page)

Chemist Says Calcium Can Cut Strontium-90 Hazard

CONTAMINATION of food crops by radioactive fallout may be reduced by adding lime to the soil.

Dr. Eric B. Fowler, chief chemist of the Los Alamos Scientific Laboratory, reporting on the results of Project Green Thumb in New Mexico, disclosed that plants grown on soil high in calcium contain less strontium-90 than those on a low-calcium soil. The calcium content is increased by applications of lime, usually in the form of limestone, which is nearly half calcium.

Lettuce, alfalfa and grass were used in this research because they represent plants consumed by human beings or animals in rather large amounts, said Dr. Fowler, who also is a bacteriologist.

"The extent of fallout and its effects on man and his environment have been studied, especially with regard to strontium-90, at Harwell in England and in this country under the Project Sunshine contract," Dr. Fowler explained. "Information obtained by a number of workers has indicated the importance of the concentration of soil calcium in the biological chain of transfer of the strontium-90 from soil to plant and hence to man. . .

"We learned that when the soil contained a relatively high concentration of calcium (from one-half to one pound per cubic foot of soil) the amount of strontium-90 in the plant compared to the calcium in the plant decreased sharply. This is of importance to man since the calcium from the food he eats becomes a part of his bone structure. Strontium will also be built into man's bones, but the higher the amount of calcium in proportion to strontium in his food, the lower will be the amount of strontium in his bones.

"It was further observed that some plants, such as lettuce and alfalfa, seemed to prefer calcium to strontium and during their growth acquired less strontium from the soil than would be expected.

"Other plants, such as grass, may prefer strontium to calcium and seem to concentrate strontium as they grow. It may be important to man to seek food plants which are similar to alfalfa and lettuce (in that they seem to prefer calcium and store it in high concentration) in order to reduce the amount of strontium which enters the bone structure.

"Other workers have reported that the strontium-90 from fallout is held in the upper two to four inches of soil. Results obtained by using a radioactive substance held in the soil at the point of application show that plants with deep roots contain only small amounts of radioactivity. Food for humans and cattle obtained from deep-feeding plants may be important sources of nutrient low in strontium." ▲

Summary of paper presented April 15, 1958, by Dr. Eric B. Fowler, Richard G. Thomas, George L. Johnson, Mitchell A. Melnick, Elgin H. Rex, Felix A. Vigil and C. W. Christenson of the Los Alamos Scientific Laboratory, University of California, before the Division of Agricultural and Food Chemistry at the 133rd national meeting of the American Chemical Society in San Francisco.

ROADSIDE SPRAYING

(from page 17)

diesel oil according to recommendations of the chemical company and the base of each stem on each bush sprayed thoroughly. Each stem should be wet to a height of 18 inches and the spray material allowed to run down the stems to the roots of the plant. This spraying can be done anytime after the foliage is off except when there is snow or water around the base of the plants. This method can also be used to kill any "weed trees" but extreme care should be taken to keep the spray from the trunk or roots of desirable trees or shrubs on or adjacent to the highway right-of-way.

Soil Sterilants

Soil sterilants have been used for many years to kill vegetation on graveled driveways, tennis courts and similar places. New improved chemicals are now available for temporary or permanent sterilizing of the soil. These materials are proving especially valuable in roadside maintenance where hand mowing or removal by hand hoes has been slow, tedious, and expensive. Now soil sterilants, in a power sprayer with suitable nozzle equipment, can cover miles of roadside in a single day. These materials and methods are especially suited to keeping guard rails, signs, signals, culvert and bridge approaches and traffic islands free of all vegetation. This adds to the safety and appearance of our highways, and at the same time lengthens the life of pavement, curbing and wood or metal fixtures.

The same types of nozzles and spray guns used for weed and brush control can be adapted to these special requirements. Where considerable mileage is involved, such as safety lanes alongside our major highways and parkways, booms with special nozzles can be attached to the truck or trailer sprayer and an even uniform application made at travel rates to 5 miles per hour. In a report by Mr. Hugh Hageweister of the New Jersey Turnpike Authority, presented at the January 1955 meeting of highway Research Board, he explains how a 3 man spray crew sprayed 160 miles of 5 ft. width of road shoulder in 2 weeks, traveling at 4 mph. This required 30 gallons of diluted chemical per mile.

Special booms have been used by some state and county highway departments for spraying of their roadside guard rails. These applications can best be made early in the season before growth of grass and weeds has started and in advance of the regular weed and brush control programs. This spreads out the spraying program and avoids adding to the labor requirement at the peak of the maintenance season. ▲

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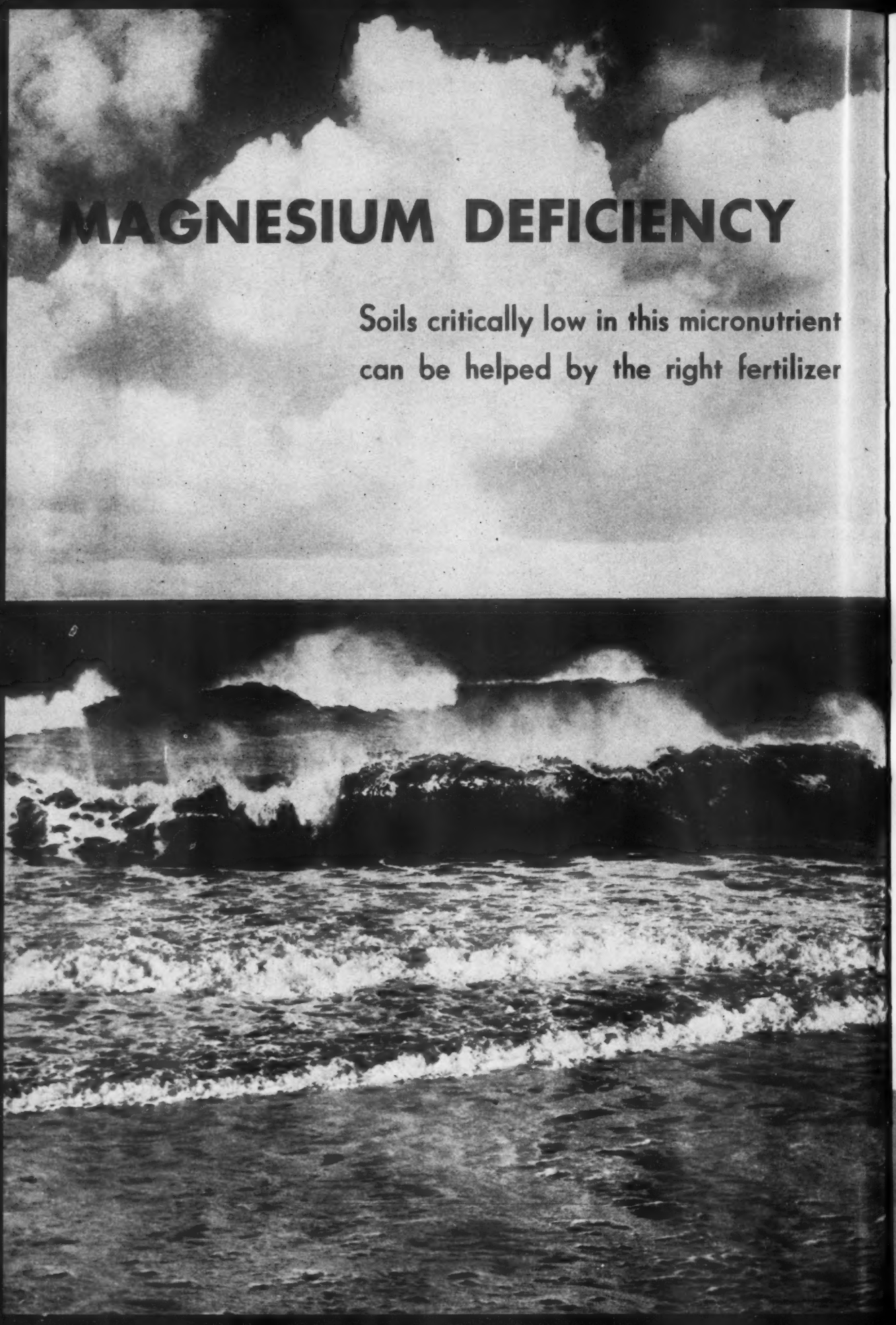

MAGNESIUM DEFICIENCY

Soils critically low in this micronutrient can be helped by the right fertilizer

By JACKSON B. HESTER

IT IS LIKELY that the heavy snow and rain of this winter and spring will create a serious magnesium problem during the coming growing season. Since Richard Willstatter, a German chemist, discovered in 1906 that magnesium is an essential component of chlorophyll, many studies have been made to show areas in which it is deficient in the soil.

The Coastal Plain soils, in general, show the greatest area of deficiency. When average fertilizer mixtures containing no magnesium in a soluble form are used in large amounts to produce high yields, magnesium deficiency very frequently becomes the limiting factor. In soils with a potentially large amount of magnesium, under heavy rainfall conditions, magnesium deficiency becomes a factor because the soluble magnesium is readily leached and the strongly absorbed magnesium does not adequately supply the plant.

The leached magnesium accounts for sea water salt analyzing approximately 20 per cent magnesium oxide. In studying sea water flooded soils on the Eastern Shore of Virginia (Soil Sci. 36:427–434, 1933) where magnesium deficiency was prevalent, no deficiency symptoms developed for several years in crops grown following the flooding. This indicates that soluble magnesium is very desirable in mixed fertilizers.

In 1934, the author published a bulletin (82, Va. Truck Exp. Sta., Norfolk, Va.) describing a method of detecting soils that are deficient in magnesium. In 1941, advancements in the laboratory method and results of greenhouse and field trials were given (Commercial Fertilizer Year Book). In 1948, improvements in methods of determining nutrients were published (Diagnostic Techniques for Soils & Crops, American Potash Institute). Further refinements of technique and methods have been made in this laboratory.

Over this period of years magnesium deficiency has increased and spread to many more areas than originally observed. With higher yields, larger amounts of magnesium are being removed and magnesium deficiency is increasing. Also, due to industrial and housing developments, more and more marginal land is being put into production.

Soil Analyses

In the past four years, this laboratory has analyzed more than 2,000 soil samples from 23 different states for the required plant nutrients and soil constituents, in order to recommend fertilizers and secondary and trace elements for crop production. The majority of these soils were from east of the Mississippi River with the greater portion from Maryland, Pennsylvania, Delaware, New Jersey, Virginia, and Maine.

Research has established to what degree soils are deficient in plant nutrients. Some soils are distinctly deficient in an element, some are moderately deficient, and others are not deficient. The pounds of the various nutrients per acre present in the soil for each of these levels have been established.

Potassium and Magnesium Deficiency Comparison

Since potassium is used in large amounts by the plant and is a part of most mixed fertilizers, it is used here for comparison with magnesium. The following data are the results of the soil samples analyzed by this laboratory.

Percentage Distribution of Samples Analyzed	Me.	N. J.	Pa.	Md.	Del.	Va.
Potash (K_2O)						
Distinctly Deficient	75%	87%	86%	91%	85%	64%
Moderately Deficient	11	11	9	6	11	28
Non-deficient	14	2	5	3	4	8
Magnesium (Mg)						
Distinctly Deficient	83%	18%	20%	45%	60%	69%
Moderately Deficient	14	56	35	31	28	35
Non-deficient	3	26	45	24	12	3

From these data it appears that more soils in Maine are deficient in magnesium than in potassium, even though 75 per cent of the soils analyzed were distinctly deficient in potassium. This was also true in Virginia but less marked in Pennsylvania, Delaware, and Maryland. However, Maryland had so many potash deficient soils that the data may be misleading.

If the potash deficiency were to be corrected, the resulting higher crop yields would make the magnesium deficiency more important.

These data show that the importance of soluble magnesium in mixed fertilizer approaches that of potassium in the areas mentioned.

Some of the sources of readily soluble magnesium for fertilizer mixtures and for direct application are sulfate of potash-magnesia, anhydrous magnesium sulfate and epsom salts. The latter two compounds add only sulfur and magnesium.

Dolomitic limestone is sometimes added to mixed fertilizers, but its magnesium, in the form of manesium carbonate, does not become available for at least one year.

The sulfate of potash-magnesia is a double salt of potassium sulfate and magnesium sulfate (22 per cent K_2O and 18 per cent MgO). It carries considerable sulfur—needed in many soils. (The sulfate of potash in this compound also is very desirable as a quality factor for many crops including tobacco, potatoes and cabbage.)

When soils are very low in both magnesium and potash, sulfate of potash-magnesia is a good compound for direct application to supplement the regular fertilizer program and bring the soils into a balanced ratio of nutrients. It can be applied as a side dressing, or broadcast. ▲

SEA WATER SALT is about one-fifth magnesium oxide. In crops grown on Virginia's eastern shore, magnesium deficiency has at times been remedied by otherwise damaging floods.

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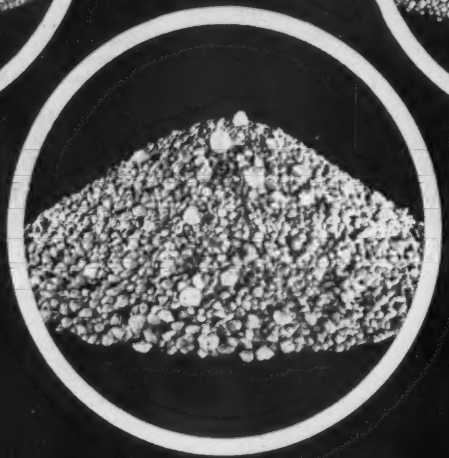

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More Profits from Grazing Land with

CHEMICAL WEED CONTROL

Excerpts from a paper entitled "Profits from Research on Control of Weeds in Pastures and Rangelands," by Dayton L. Klingman, Research Agronomist, U. S. Department of Agriculture, presented at the Western Weed Control Conference, Spokane, Washington, March 18–20, 1958.

WEEDS and brush infest most of the 536 million acres of grazing land in the 11 western states. Because the losses from these unwanted intruders have not been accurately assessed, the data on total losses cannot be presented. However, we know that for each pound of dry matter produced by weeds about an equal amount of more desirable forage could be raised. Partial control of brush on rangelands has resulted in three to eight times as much forage as grown on comparable untreated sites. Poisonous plants cause more financial loss by killing livestock than by crowding out useful forage plants.

Weeds have some value. To maintain proper perspective one should recognize their usefulness. Weeds contribute to the diet of livestock, provide some protection against wind and water erosion, and sometimes protect native grasses from severe overgrazing. But these values do not justify perpetuation of weeds, and in spite of our control efforts, we probably shall continue to have more weeds and brush than are wanted on the rangelands.

In Table 1 the annual increase in yield of forage resulting from treatment, as well as the estimated costs of treatment are shown. From this information are developed figures showing annual net gain converted to the annual return if all acres adapted to spraying were sprayed. The value of the increased forage was assumed to be $10 per ton. The cost of spraying was pro-rated over a 10-year period.

Good returns in increased forage resulted from controlling juniper in Arizona, but a practical herbicide treatment has not yet been developed. Mechanical methods and burning have been used, but cost figures vary widely.

The examples in Table I indicate the profits possible from weed control in grazing lands. Many weed problems have not been covered. Downy brome has invaded most of the rangeland in the northern two-thirds of the western region. What gain would result if it could be replaced with desirable perennial vegetation? What are the losses from halogeton, other poisonous plants, chaparral species, and many others? There are not enough data to answer such questions.

In Table 2, three methods of weed control in a Nebraska experiment are compared. Results of this experiment may be representative of areas in favored sites of the West. All methods of control

TABLE 1. Some Estimated Potential Returns for Spraying

Weeds	Annual Yield Increase (lb/A)	Cost for Treatment ($/A)	Annual Net Gain[1] ($/A)	Acres Adapted to Spraying (millions)	Annual Return (millions)
Big sagebrush (Oregon)	400[2]	$3.25	$1.68	24	$40.2
Low larkspur and sagebrush (Oregon)		3.25	1.83	1	1.8
Rabbitbrush (Oregon)	400	5.00	1.50	1	1.5
Sand sagebrush (Oklahoma)	1,000	4.50[3]	1.10	15	16.5
Mesquite (Arizona)[4]	170	7.00	0.15	70	10.5
Juniper (Arizona)	400			25	
Plantain leafed buttercup (California)	442	3.25	1.89		

[1]Increased gross return less the cost of treatment spread over 10 years. Assumed $10 per ton dry weight for forage.

[2]D. W. Bohmont and H. Alley show about the same results for 2,4-D on big sagebrush in Wyoming.

[3]E. H. McIlvain has indicated $2.50 for treatment and $2.00 cost of deferred grazing for 2 years.

[4]Extrapolations from F. H. Tschirley's data. Climatic conditions differ widely in areas infested with mesquite.

resulted in an increase of forage eaten by cattle. All methods gave good returns on the investment but the most expensive method (plowing, reseeding, plus 2,4-D), gave the highest net return. There are more differences between the treatments than are shown by the data. The condition of the pasture was greatly improved by the last treatment. The second treatment, spraying with 2,4-D, also gave high percentages of killed weeds and of improved grass that will continue to be shown in yields after annual treatments are stopped. There was little reduction in perennial weed population by mowing, and benefits in pasture condition from this treatment were slight. Annual mowings will be required to realize even a small improvement in production.

What losses in establishment of new seedings of forage species can be attributed to weeds? It is well known that moisture supply is critical to seedling establishment. How many weeds does it take to exhaust the moisture and cause mortality of the seeded species? Even where moisture is plentiful, losses often result from shading by weeds. There is need for study of the effects of weeds upon seedling establishment of forage species.

New specific herbicides that control broadleaved weeds in legume seedings with benefit to stands and vigor of the legume are becoming available. Certain other chemicals will selectively remove annual weed grasses from perennial grasses; for instance, downy brome from smooth bromegrass. It may be possible eventually to remove selectively annual weed grasses from perennial pasture grass seedlings. However, such chemicals are not yet known. That this is within the realm of possibility is shown by the true tolerance of corn, an annual grass, to Simazine. Most other grasses are severely injured by Simazine. (*Editor's Note: See Page 27.*)

The economics of weed control can fluctuate widely with prices. Economists would be critical of the inadequate treatment of costs in this report. It is important that enough basic data is reported from research so that new evaluations can be made by economists, or new calculations can be made when economic conditions are changed.

TABLE 2. Estimated Returns for Weed Control in a Pasture in Nebraska (28-inch rainfall)

Treatment	Annual Increase in Forage Eaten (lb/A)	Annual Cost of Treatment ($/A)	Annual Net Gain[1] ($/A)
Mowed	280	$1.25	$ .85
Sprayed with 2,4-D	680	2.50	2.60
Plowed, seeded to warm season grasses + 2,4-D	1,830	4.85	8.90

[1]Increased gross return less the cost of treatment prorated over 10 years. Assumed $15 per ton dry weight for forage eaten.

TABLE 3. Downy Bromegrass Control in Alfalfa. Two Year Average, Prosser, Washington

Treatment	Rate (lb/A)	Yield, First Cutting (T/A)	Cost of Treatment ($/A)	Gain[1] ($/A)
Endothal	6	3.33	9.10	17.60
Endothal	8	3.15	11.80	9.50
Dalapon	5	3.12	6.00	14.55
Dalapon	10	2.95	11.00	4.30
Check	0	2.44	0.00	0.00

[1]Increased yield times $30 per ton, minus cost of treatment.

Sometimes weed grasses are also a problem in established alfalfa. All herbicide treatments gave over 90 per cent control in the two years reported. Returns are striking when the value of the hay is figured at $30 a ton. But if the value of hay is reduced to $15, the return is reduced more than one-half. For example, the return for the first treatment would be reduced from $17.60 to $4.25. For the second treatment, the gain for treatment would be reduced from a gain of $9.50 to a loss of $2.15 for treatment.

Farm losses to weeds are estimated to equal the combined losses to insects and diseases, and are second only to soil erosion. One plant of common mustard takes twice the nitrogen, twice the phosphorous, four times the potash and four times the water that a well-developed oat plant requires.

The chemical and equipment industries devote several million dollars each year to research and development work on better herbicides and better application methods. In 1957, state agricultural experiment stations spent over $1½ million and the USDA spent over $700,000 in research and development in weed control.

Over 2½ million acres of pastures and rangelands were sprayed with herbicides last year. The cost of the chemicals per acre averaged $1.10. Custom operators across the country charged on the average $2.60 an acre, including chemical cost.

Available data, although they are fragmentary, indicate high potential profits for weed control in pastures and rangelands.

Dollar profits possible from weed control must be a major consideration in taking research results to the rancher or farmer. Among other profits from weed control are the improved quality of forage, improved condition of the range, reductions in hazards from poisoning, increased water yield on some watersheds from brush control, and the greater ease of managing livestock on ranges relatively free of weeds and brush.

The importance of improved methods of control of serious weeds is obvious. The effects of weed control on other vegetation and the interrelated ecological effects must be thoroughly studied. In arid regions, changes in vegetation may come slowly and the margin of profit is small. There is need for careful research to build a foundation of knowledge upon which the rancher can base his decisions on spending for rangeland improvement. ▲

NOW you can formulate high concentrate wettable powders at low cost with MICRO-CEL

SUBSTANTIAL FORMULATION SAVINGS

Micro-Cel*, a new line of synthetic calcium silicates, has extremely high absorptive properties. It is this remarkable capacity for absorption that makes it possible to prepare wettable powders with higher concentrations of dry, viscous or liquid poisons. Micro-Cel's absorption also means that more lower cost diluents can be used. Thus high strength formulation costs are now cut to a new low.

REMAINS FREE-FLOWING—MEETS STORAGE TESTS

With Micro-Cel, these high concentrates will remain in a free-flowing state even after prolonged storage. This is particularly important in producing poisons for the export market.

In addition, suspension values after storage of 1.5 to 2.0 I.C.A. have been achieved in 75% DDT wettable powders, based on Micro-Cel. This is more than adequate for storage conditions encountered in most tropical countries.

DEVELOPED BY JOHNS-MANVILLE RESEARCH

Micro-Cel is another development of Johns-Manville Research. Combining high absorption, large surface area, small particle size and excellent dry flowability, it offers a unique combination of properties for insecticide formulation and other process needs.

Sample quantities and carload shipments are now available. Write for further data and sample formulations for poisons of interest to you. Or ask a Celite engineer to help you adapt Micro-Cel to your particular requirements and specifications.

*Micro-Cel® is Johns-Manville's new absorbent-grinding aid designed specifically for the insecticide formulator.

Johns-Manville

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A PRODUCT OF THE CELITE DIVISION

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Please send ☐ further information; ☐ samples of Micro-Cel. I am interested in using Micro-Cel with the following poisons:

☐ Please have your local representative contact me.

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Company_____

Address_____

City_____ Zone_____ State_____

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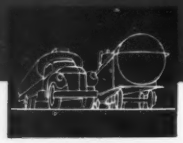
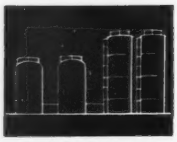
of agricultural

NITROGEN

get three vital services from Texaco Lockport, Ill. plant





1. Fast Delivery. Lockport is located in the heart of the midwest, convenient to major rail, water and truck routes—and there is a brand new transport fleet to assure on-time deliveries.

2. Ample Storage Facilities. You have a dependable supply of agricultural ammonia—available when you need it, to meet your own schedules.

3. Texaco Technical Service. Experienced Texaco personnel are available to assist users of ammonia and nitrogen solutions to improve their operations.

And, of course, you're sure that the nitrogen solutions or agricultural ammonia you get from Texaco-Lockport will be absolutely pure and completely uniform, because Lockport's processing and handling equipment is *all new*.

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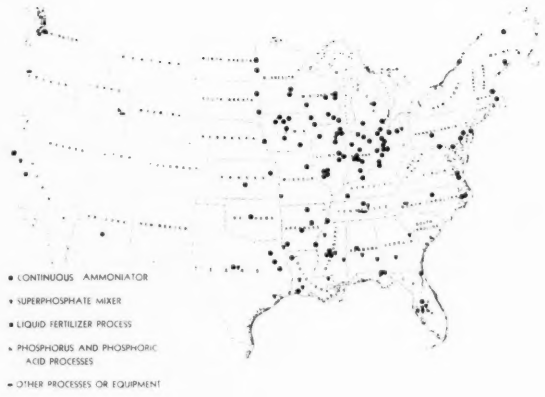
PETROCHEMICALS

Call or write The Texas Company, *Petrochemical Sales Division,* 332 South Michigan Avenue, Chicago 4, Illinois, or 135 East 42nd Street, New York 17, N. Y.


• CONTINUOUS AMMONIATOR
• SUPERPHOSPHATE MIXER
▪ LIQUID FERTILIZER PROCESS
▪ PHOSPHORUS AND PHOSPHORIC ACID PROCESSES
▪ OTHER PROCESSES OR EQUIPMENT

TVA DEVELOPMENTS In 140 Plants

TO illustrate how the Nation benefits from its fertilizer research and development program, the Tennessee Valley Authority has issued this map showing the location of 140 industrial plants licensed to use TVA developed processes or equipment. TVA research is carried on at its laboratories and plants at Muscle Shoals, Alabama.

The most widely applied development, as shown by its use in more than 100 plants, is the TVA-type ammoniator granulator. About two-thirds of the country's granular fertilizers are made in this type of equipment, according to TVA.

TVA says application of its liquid fertilizer processes is just beginning. Other new processes are under study in its laboratories which should permit production of cheaper and more concentrated liquid fertilizers.

The map indicates but a part of the technical services provided to industry by TVA. Since 1945, about 8,000 industry representatives have visited Muscle Shoals to obtain information, almost 10,000 items of technical information have been supplied by correspondence and 86,000 reprints of articles and other technical and semitechnical reports covering the results of TVA work have been distributed.

TVA's interest in fertilizer originated with two World War I nitrate plants at Muscle Shoals. Idle throughout the 1920's, they were turned over to TVA with instructions from Congress to use them to improve the quality of fertilizers and lower their costs to farmers.

These plants have been transformed into experimental and demonstration units for chemical and engineering research in fertilizers and munitions. Combined with the controversial fertilizer use education programs, they have been a constant influence in keeping the price of fertilizer down and in encouraging conservation agriculture. ▲

GEIGY formulations of Simazine were recently accepted by the U.S. Department of Agriculture for pre-emergence weed control in corn.

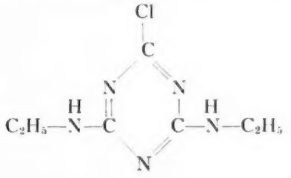
In 1956 and 1957 field trials, pre-emergence applications gave excellent control of broadleaf and grassy weeds in corn for the entire growing season with no injury to the crop.

The Simazine is activated by rainfall which distributes it through the surface layer of soil. It penetrates the weeds through their roots. Simazine is most effective in pre-emergence applications. Since it is practically insoluble in water, it remains in the upper soil level, where it can kill germinating weed seeds—and there is little or no lateral movement in the soil by water.

This is very important in selective weed control, especially in band treatments, and it's also important in non-selective or general weed control when treating sites that may be adjacent to cultivated land.

When post-emergence applications of Simazine are made, it is necessary to use enough water to carry the material to the root zone, since its effectiveness is due to its action against the root system rather than contact action against the above-ground parts. Because of this, there is little or no drift hazard.

Simazine is 2-chloro-4, 6-bis(ethylamino)-s-triazine and has the following structure:



The new label approval covers both Simazine 50W (50 per cent wettable powder) and Simazine 10G (10 per cent granules). Also on the labels are directions for non-selective weed control on non-cropped land, and weed control in ornamentals and nursery stock.

The company reports that tests conducted thus far indicate that Simazine remains active in the soil for approximately six months when applied at the rate of 2 pounds an acre. Results to date indicate that there are no adverse effects on rotation crops planted one year following application at that rate. Further studies are being made to determine residual activity under various environmental conditions. ▲

USDA accepts SIMAZINE 50W label for corn

Farmers say that of mass media,

FARM MAGAZINES *help most on fertilizer*

WHAT influences the farmer who is in the market for fertilizer? The questions in Part II of the fertilizer buying study conducted last Spring by National Analysts, Inc. for Nitrogen Division, Allied Chemical Corp., were designed to find out.

The areas sampled were 15 counties in Michigan, Illinois, Indiana, and Ohio having sales of 100 tons or more of a selected brand of mixed fertilizer.

In Part II of the study, released last month, 396 statistically selected farmers were interviewed, to discover the relative values of various communications media in influencing the farm buyer of fertilizer.

In one question, farmers were shown a card listing five communications media, and asked which source most often supplied information helpful in their day-to-day farm management problems. They were also asked to name which they would place second and third. Farm magazines placed first, followed by state farm papers, radio, newspapers, and television. (Of 396 respondents, only 46 said they had no television.)

Asked with whom they talked about fertilizer needs or buying, 46 per cent said they did not discuss it with anyone, 29.3 per cent said they talked with the dealer or salesman, 15.2 per cent with an "agriculture official," and 8.6 per cent with neighbors. The farmer's wife or other family members were consulted by 10.2 per cent.

What did they talk about? Analysis was discussed most frequently. Of the farmers who said they talked with dealers or salesmen, 69.9 per cent discussed analysis; those who talked with agriculture officials, 83.3 per cent; those who talked with neighbors, 50 per cent.

Some other topics discussed with dealers or salesmen were price, by 51.3 per cent of respondents; amount, by 26.5 per cent; and brand, by 15 per cent.

With agriculture officials, amount was discussed by 31.7 per cent; expected results by 10 per cent; and price by 8.3 per cent.

Neighbors were consulted on expected results by 35.3 per cent of the respondents; on amount by 29.4 per cent; and on price by 26.5 per cent.

Fertilizer talk with wives was mostly about price (89.5 per cent), followed by amount, analysis, and expected results.

	Farm Magazine	State Farm Paper	Radio	News-paper	T.V.
Number of cases	219	75	59	24	6
No answer	2	3	—	—	1
Number answering	217	72	59	24	5
	%	%	%	%	%
Fertilization Practices, Recommendations	**32.3**	**43.1**	**13.6**	**33.3**	**40.0**
Farming and Production Practices	**63.6**	**51.4**	**61.0**	**41.7**	**20.0**
Selling and Marketing Practices	**11.1**	**9.7**	**45.8**	**25.0**	**40.0**
Farm Legislation	**.5**	—	**1.7**	—	—
Weather Reports	**1.8**	**1.4**	**42.4**	**4.2**	**20.0**
No information	**2.8**	**2.8**	**3.4**	**8.3**	—
Other	—	—	**1.7**	—	—
Don't know	—	**1.4**	—	—	—

Farmers were asked what information they get from the source they ranked most helpful.

"DOG TAGS" for Ag Pilots

DURING recent years the ever-increasing dangers of over-exposure to chemicals has become a major problem among this country's approximately 5,000 agricultural pilots. Another 15,000 to 20,000 ground-crew men—loaders, flagmen, mechanics—also face the risk of contamination by direct contact with the same potent chemicals.

In view of the need for greater recognition of these hazards, considerable effort has been put forth by the chemical industry, the American Medical Association, insurance and other interests to familiarize all concerned with preventive and first aid measures.

"Jake" Jacobson of Northwest Underwriters, Portland, Oregon, has devised and is distributing free "dog tags," to be worn by applicator pilots and other handlers of farm chemicals. Sealed in a plastic case about 1½" x 2½", the tags are light, permanent and can be worn around the neck attached to a chain or string. On one side is the wearer's name, address and phone number, blood type, etc., and these highly important instructions to anyone who might have occasion to read it: "My Work in Agricultural Aviation Exposes Me to Dangerous Chemicals—IF FOUND ABNORMAL IN ANY WAY, RUSH ME TO A HOSPITAL!" On the reverse side are brief but adequate instructions to the attending physician.

DEPENDABLE SOURCE FOR YOUR HIGH QUALITY MATERIALS

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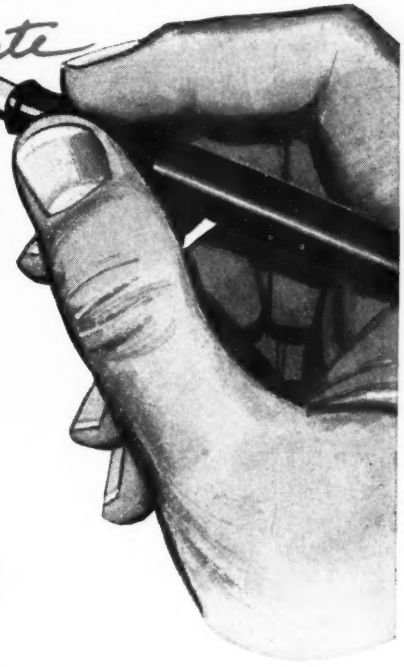

You can always *rely* on Phillips *66* premium fertilizer materials for your high-quality mixtures these four ways:

Years of experience and know-how go into each run of Phillips *66* chemical fertilizer materials.

Phillips *66* has a continuing program of research to improve and maintain high standards of quality.

Rigid control from raw materials to finished products insures constant uniformity.

Extreme care in loading and shipping in clean cars assures you of high purity on delivery.

Call your Phillips *66* representative today. He will be glad to give you the benefit of Phillips technical service and counseling backed by years of experience.

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HOUSTON, TEX.—6910 Fannin St.
INDIANAPOLIS, IND.—3839 Meadows Drive
KANSAS CITY, MO.—201 E. Armour Blvd.
MINNEAPOLIS, MINN.—212 Sixth St. South
NEW YORK, N. Y.—80 Broadway
OMAHA, NEB.—3212 Dodge St.
PASADENA, CALIF.—317 N. Lake Ave.
RALEIGH, N. C.—401 Oberlin Rd.
SALT LAKE CITY, UTAH—68 S. Main
SPOKANE, WASH.—521 E. Sprague
ST. LOUIS, MO.—4951 Lindell Blvd.
TAMPA, FLA.—3737 Neptune St.
TULSA, OKLA.—1708 Utica Square
WICHITA, KAN.—501 KFH Building

STAUFFER TRITHION PLANT COMPLETED

The first commercial plant to produce Trithion, the new insecticide-miticide developed by Stauffer Chemical Co., has been completed at Henderson, Nevada. The new product will now be available to both domestic and foreign growers.

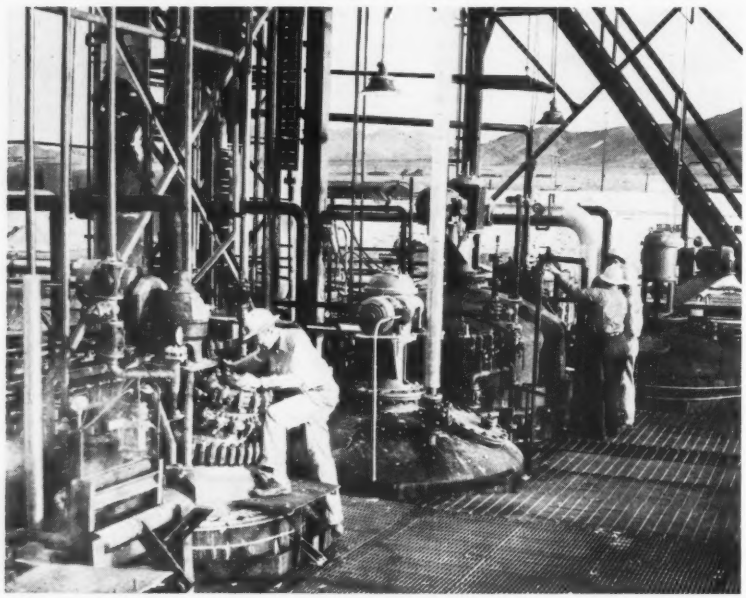
Trithion (chemically, O, O-diethyl S-p-chlorophenylthiomethyl phosphoro-dithioate) is a non-systemic residual compound which is effective against a wide range of insects. Trithion has the longest residual activity of any common organic phosphate and is less hazardous to apply than many other phosphate insecticides, Stauffer claims. The new product does not affect the taste or odor of any crop tested, according to the company.

The new material can be formulated as a dust, wettable powder, flowable concentrate, or as an oil additive. It is compatible with most other insecticides and fungicides, including lime-sulfur.

Trithion controls 104 varieties of pests on 45 crops. Among the major pests controlled are mites (including mite eggs), aphids, scale insects, mealy bugs, white flies, leaf hoppers and leaf miners. Field and laboratory tests have also shown that the pesticide is effective against some caterpillars, including the coddling moth, and the cotton leaf perforator and certain beetles, including the Mexican bean beetle.

An official tolerance has been established on apples, pears, crabapples and quinces in the United States and Canada, the company says. Approval has been granted on a limited basis for application of Trithion to many other crops.

Skilled employees operate the reactors of Stauffer's new Henderson plant to produce the new insecticide-miticide, Trithion. This outdoor plant is the first large commercial unit for this insecticidal compound developed by Stauffer.



FMC REORGANIZES CHEMICAL OPERATIONS

Food Machinery and Chemical Corp. has created two new operating chemical departments and enlarged its executive committee in a move to streamline the organization of its chemical operations, according to Dr. Carl F. Prutton, executive vice president.

The new operating units are the FMC Organic Chemicals Dept. and the FMC Inorganic Chemicals Dept. and the FMC Inorganic Chemicals Dept. The first includes Niagara Chemical Div. and the Chemicals and Plastics Div. (formerly the Organic Chemicals Div.). The second comprises the Becco Chemical Div., Westvaco Chlor-Alkali Div. and the Westvaco Mineral Products Div.

FMC Vice President Alfred T. Loeffler is named general manager of the Organic Chemicals Dept., assisted by R. H. F. Dade, who has been named a vice president of the Chemicals Divisions. General manager of the Inorganic Chemicals Dept. is Frederick A. Gilbert. Donald C. Oskin will be assistant general manager and has been named a vice president of the Chemical Divisions.

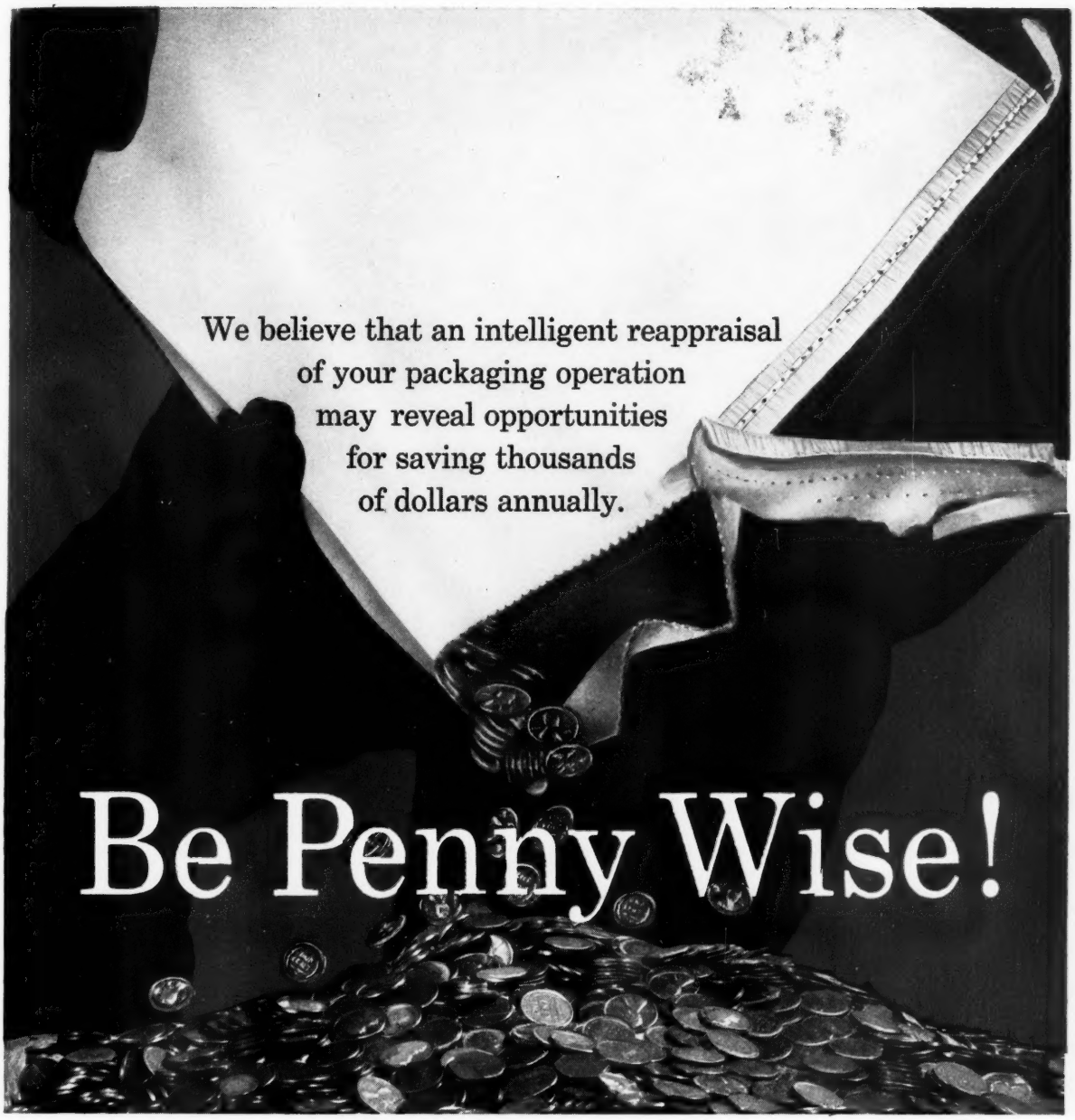
Division managers are as follows: Westvaco Chlor-Alkali Div.—Robert J. DeLargey; Westvaco Mineral Products Div.—Raymond F. Moran; Becco Chemical Div.—Dewey H. Nelson; Niagara Chemical Div.—Stuart Bear; and Chemicals and Plastics Div.—Henry S. Winnicki.

TWO FLORIDA TERMINALS INSTALLED BY NITROGEN DIV.

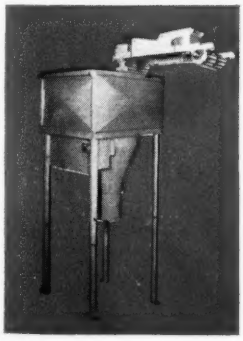
Nitrogen Division, Allied Chemical Dye Corp., is installing two large-volume nitrogen solution storage terminals in Fla.

Both terminals will store Urana and Nitrana solutions; and both will be located on the St. John's River, one at Jacksonville, the other at Sanford.

Nitrogen solutions will be shipped to the two terminals by barge via the Inland Waterway from the Division's manufacturing plant at Hopewell, Va. Shipment from the terminals to customers will be by rail and tank truck.



IN BUYING MULTIWALL BAGS NO SAVING IS TOO SMALL TO IGNORE!



THE KRAFTPACKER Open Mouth Bag Filling Machine, for free-flowing material, automatically saves pennies, too, through higher production and greater accuracy. Requires a lower investment and maintenance cost than any other automatic machine of its type in use today!

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PRODUCT MFD.....

NAME.....

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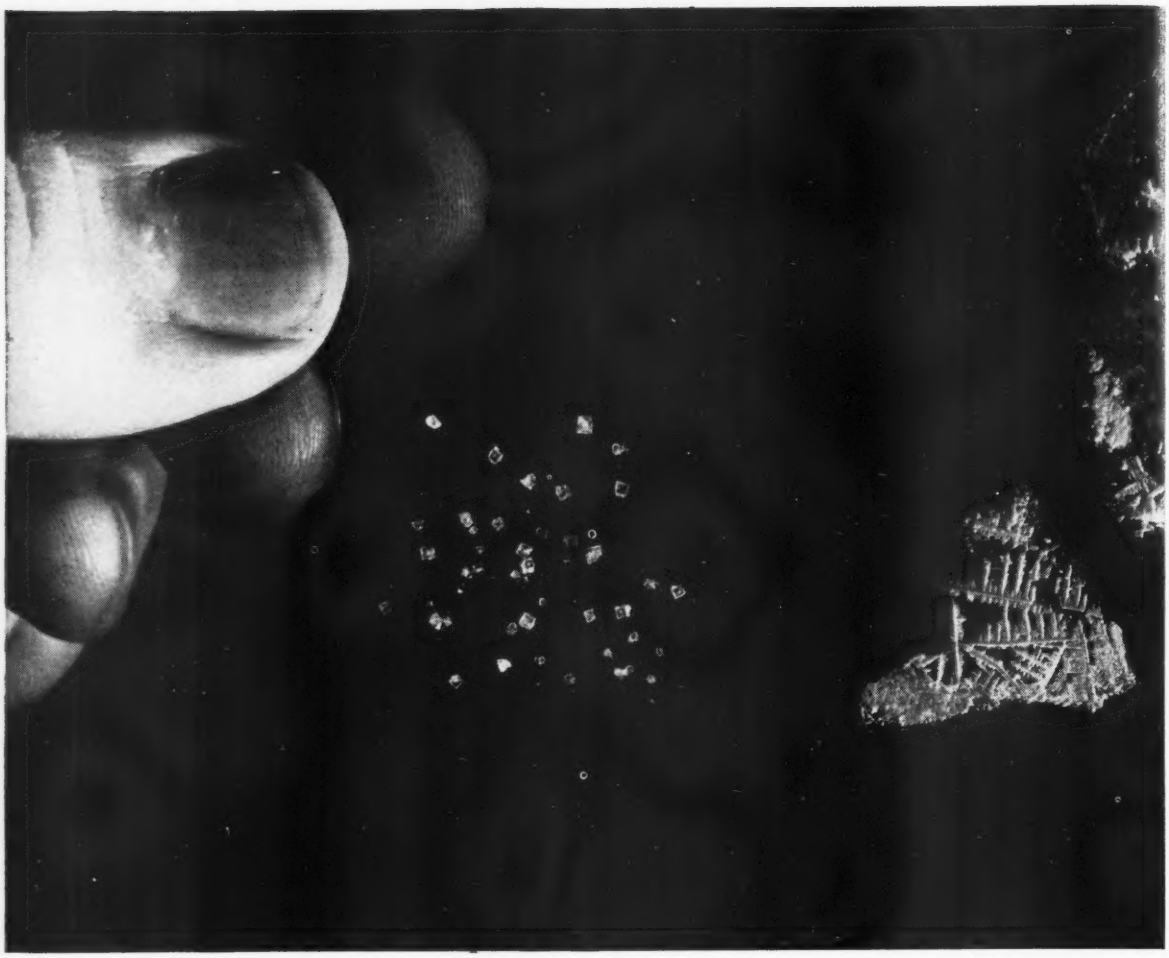


How to cut cake with a cube

TAKE a fern-shaped ammonium chloride crystal. Change its form to a cube, and you've cut fertilizer caking and bag-set in a hurry.

In fertilizers, ammonium chloride is formed during the mixing process by reactions between nitrogen materials and potassium chloride.

Ordinarily, it develops into fern-shaped crystals with hundreds of tiny, finger-like projections like those shown at right above. These crystals will cement fertilizer particles into a cake.

But now you can shape those crystals into non-caking cubes — and do it every time — with Sohiogen ammoniation solutions.

Sohiogen solution Nos. 10, 11, 15 and 16 are specially formulated with just the right amount of urea and ammonia with the ammonium nitrate to transform ammonium chloride crystals into square-edged, free-flowing cubes.

What's more, with these Sohiogen solutions, you finish three jobs at once. You solve costly conditioning problems, complete ammoniation and add supplemental nitrogen to meet grade.

So if caking is one of your problems, call the man from Sohio. He'll be glad to show you how Sohiogen improves formulation and cuts costs.

We're serious about service at Sohio

SOHIO

SOHIO CHEMICAL COMPANY

FT: AMANDA RD., P. O. BOX 628, LIMA, OHIO

OM INSECTICIDES DEPT. MOVES CHICAGO OFFICE

The Chicago office of the Insecticides Products Dept. of the Industrial Chemicals Div., Olin Mathieson Chemical Corp., has moved into the division's main sales office in the Wrigley Building, 400 N. Michigan Ave., according to W. Adrian King, division sales manager. The department formerly was located at 350 N. Clark St.

DUPONT SCHOOL GRANTS FOR AGRICULTURAL RESEARCH

Grants totaling more than $50,000 for applied research on agricultural applications of high-content nitrogen compounds have been awarded to 16 universities and colleges for 1958, reports DuPont's Polychemicals Dept.

The grants are in addition to the company's annual program of aid-to-education. The money will be applied to research on "Uramite" and "NuGreen" fertilizer compounds used for turfgrass, florist crops, woody ornamentals, fruits and forests, as well as "Two-Sixty-Two" feed compound for beef and dairy cattle feeds.

MEYER FIRM OCCUPIES NEW LOS ANGELES PLANT

Jeffrey W. Meyer and T. W. Harris, Meyer vice presidents; John Hooper, agr. sales manager, Southwestern Div.; and Wilson Meyer, president, at the dedication.

On April 2, Wilson & Geo. Meyer & Co. officially dedicated its new enlarged southern California offices, warehouse and bulk storage facilities.

Located at 2060 South Garfield Blvd., the plant was erected at a cost of about $500,000.

NEW ISA FILM: PRINCIPLES OF FREQUENCY RESPONSE

A new color-sound film to instruct manufacturers, designers, users and students of control equipment in the principles and techniques of frequency response analysis has just been made available by the Instrument Society of America.

The society says frequency response analysis is a simple concept, but one often misunderstood. It refers to one method of putting any system through its paces by introducing a changing rhythmic input (like alternating current) into it and seeing what effect these changes will have on its output. The relation between the changing input and the resulting output reveals the control characteristics of that system.

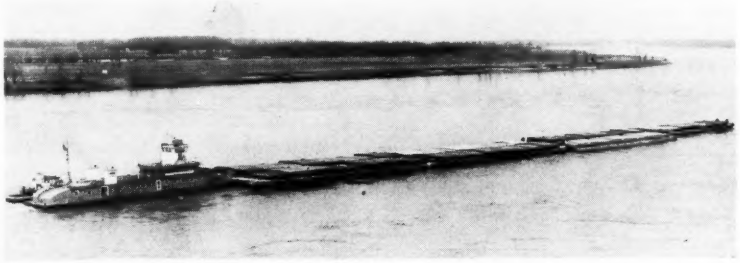
In the 37-minute film frequency response analysis is described as applied to a liquid-level system. For information on purchase or rental of the film, contact ISA, 313 Sixth Ave., Pittsburgh 22, Pa.

FLOATING WAREHOUSE ON THE MISSISSIPPI

The largest single-owner shipment of plant food ever to go up the Mississippi River was sent to the Midwest's great farm belt this spring, reports International Minerals and Chemical Corp., the shipper.

About 10,000 tons of phosphate materials valued at almost half a million dollars was in the eight-barge tow which left Baton Rouge in mid-March. IMC officials called this another first in the company's record of pioneering phosphate shipments via inland waterways, a plan started on a full-scale basis little more than a year ago after several years of experimentation.

The barge tow actually becomes a "floating warehouse" supply from which IMC salesmen distribute as it moves up the river. Barges were loaded at Baton Rouge from ships and ocean-going barges which brought the materials across the Gulf of Mexico from Tampa, Fla. The phosphate rock was shipped to Tampa from IMC mines at Bartow, and the triple superphosphate came from the company's processing plant at Bonnie, Florida.



TABUTREX ACCOUNT AWARDED MOHR & EICOFF

Promotion of its insect repellent ingredient, Tabutrex, has been assigned by Glenn Chemical Co. to Mohr & Eicoff, Inc.

Alvin Eicoff, agency executive vice president, said that a budget of $180,000 will be spent for consumer advertising of Tabutrex. This, he continued, is thought to be the top figure appropriated for the promotion of an insecticide ingredient.

NEW CORRIGAN AGENT

Appointment of the Pittsburgh Standard Building Corp. as agents in the Pittsburgh area has been announced by the J. C. Corrigan Co., Inc.

STAUFFER DIVIDEND

Director of Stauffer Chemical Co. in March declared a quarterly dividend of 45 cents per share payable June 2, 1958 to stockholders of record on May 16, 1958.

FARM CHEMICALS

— *Business & Management* —

HOOKER & SHEA DIRECTORS APPROVE CONSOLIDATION

The boards of directors of Hooker Electrochemical Co. and Shea Chemical Corp. on April 15 approved a formal agreement for the consolidation of the two companies subject to the approval of the stockholders of each company.

Both companies have directed the calling of special meetings of the respective stockholders on May 28, at which time the consolidation agreement will be submitted for approval.

Under the terms of the proposed consolidation, Hooker will be the continuing company and its name will be changed to Hooker Chemical Corp.

The consolidation will be effected by the issuance of 800,576 shares of Hooker common stock in exchange for all of the presently outstanding 1,401,010 shares of Class A and Class C common stock of Shea and 41,200 shares of Hooker common stock in exchange for all of the presently outstanding 6000 shares of Shea $7 cumulative preferred stock.

TEMPORARY CUTBACK AT CYANAMID PHOSPHATE UNIT

A cutback of 40 per cent has been ordered by American Cyanamid Co. at its Brewster, Fla., phosphate plant, the *Journal of Commerce* recently reported.

The *Journal* quoted a company official as saying, "Sales are not off but we just produced more than we had planned to produce so that inventory is higher than normal." He added that it would mean laying off 40 men for five months.

AFRICAN PYRETHRUM GROWERS REAPPRAISE AMERICAN SERVICES

African growers of pyrethrum are reappraising their sales, distribution and research programs in the American market. Objective is said to be modernizing of procedures.

As of March 10, the African Boards terminated an agreement whereby Mitchell Cotts & Co., Ltd., of London, acted as pyrethrum sales agent. As a result, Greene Trading Co. of New York, a wholly-owned subsidiary of Mitchell Cotts, ceases to be sales agent in the United States.

H. Alvin Smith, formerly president of John Powell & Co., becomes special representative in the United States.

SAFETY AWARD TO CORONET

The National Safety Council has announced that Coronet Phosphate Co., a division of Smith-Douglass Co., Inc., has been named first place winner for 1957 in the council's Division 4 Fertilizer Section.

An award plaque will be presented the Coronet operation, near Plant City, Fla., for having achieved the best safety record among competing phosphate mines during 1957.

STAUFFER LEASES MORE NYC OFFICE SPACE

Additional office space at One East 47th St., New York City, has been leased by Stauffer Chemical Co. The company's main offices remain at 380 Madison Ave.

The new address will be the headquarters of the Northeast Region Staff of the Agricultural Chemicals Div. This office will be responsible for handling sales, credit, orders, billing and accounts receivable in the Northeast Region.

DAVISON FACILITIES FOR R-O-P TRIPLE SUPER

Facilities costing almost $1.5 million have been added to Davison Chemical Co.'s Bartow, Fla., triple superphosphate plant. They will enable the plant to produce run-of-pile triple super, an addition to the granulated material previously turned out.

Both processing and storage facilities were added to the Bartow plant. To obtain the new product, the strength of phosphoric acid produced there is raised by evaporation to more than 54 per cent P_2O_5 from the 39 per cent used for granulated material.

This higher strength acid is combined with ground phosphate rock in a TVA type cone mixer and the resulting slurry is solidified on a setting belt. After curing in the storage plant, the product is milled and screened prior to shipment.

The additional process does not raise the overall production total of the plant.

Storage building at extreme left, in back of it tower-like shipping facility. Conveyor belt extends to storage building from new processing section in center.

AMERICAN CYANAMID MERGES TWO DIVISIONS

American Cyanamid Co. has merged its Farm and Home and Phosphates and Nitrogen Divisions, W. G. Malcolm, president, has announced.

The new organization, known as the Agricultural Division, has Frank S. Washburn as its general manager. C. D. Siverd has been appointed assistant general manager. Prior to the merger Washburn and Siverd were managers of the Phosphates and Nitrogen and Farm and Home Div., respectively.

N DIV. REORGANIZES DEVELOPMENT DEPT.

Under the new organization of Nitrogen Div., Allied Chemical Corp.'s Development Dept. at Hopewell, Va., Dr. E. D. Crittenden, former director of research, becomes a consultant to Vice President F. O. Agel. Crittenden will be concerned with general implications of the research program and new directions which the division's research should explore.

Three men appointed to the new positions of associate director will review and evaluate the department's program, Agel said. They are Dr. L. J. Beckham, former chief of ammonia research; Dr. C. K. Lawrence, former chief of organic research; and E. W. Bowen, former executive assistant to the vice president.

PHILLIPS FERTILIZER SALES INCREASED IN '57

Stimulated by more rainfall throughout its marketing territory and growing acceptance by farmers and ranchers, fertilizer sales volume of Phillips Petroleum Co. in 1957 rose 20 per cent over the previous year, according to the company's annual report.

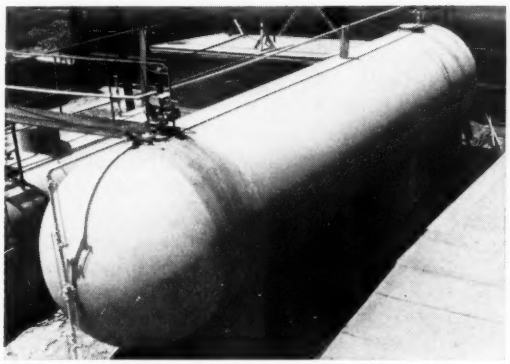
Anhydrous ammonia production at the rate of 1,060 tons daily was 10 per cent higher than in 1956. Ammonium sulfate output remained about the same at 1,150 tons a day. There was a 15 per cent rise in production of ammonium nitrate to a daily average of 335 tons, the company said, and output at its two West Texas sulfur plants increased 12%.

"Payload Convoy West"—Part of a ten-mile long truck caravan of "PAYLOADER" tractor-shovels en route from The Frank G. Hough Co. plant, Libertyville, Illinois, direct to Salt Lake City, Utah, late in April. More than a million dollars worth of equipment was transported on the trip.

ALLIED CHEM. NAME CHANGE

Approval by a majority of the holders of outstanding common stock has made the name change of Allied Chemical & Dye Corp. official. The new name is Allied Chemical Corp.

Glenn B. Miller, president, said that the board of directors believed the shorter name would "more clearly reflect the broad nature of the company's position in the chemical industry" and would be "better adapted to identify the company in its public and trade relations and in advertising its products."



FIRST with Aluminum Tanks for Nitrate Solutions

• COLE was first to build welded aluminum tanks for nitrate solutions, just as we have always pioneered in supplying the plant food industry with tanks or equipment for the storage or processing of agricultural chemicals. . . . Send us your inquiries for conventional or special design tanks—shop built up or field erected, using flat, flanged and dished, or hemispherical heads. Write for a copy of *Tanks and Equipment for the Plant Food Industry.*

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Elevated Tanks, Pressure Vessels, Chemical and Processing Equipment from Aluminum, Stainless and Carbon Steel, Monel and Other Alloys.

Established 1854

R. D. COLE MANUFACTURING CO.
NEWNAN, GEORGIA

FARM CHEMICALS People

American Cyanamid Co. Agricultural Div. appointments announced: Dr. J. T. Thurston to technical director; B. F. Bowman, marketing director; and G. L. Oppel, manager of manufacturing.

Walstad

Daniel O. Walstad has been named a staff engineer in the Agricultural Div. His duties include liaison work in technical chemical sales, manufacturing and research on product development.

Berkshire Chemicals Inc. W. L. Gay, vice president in charge of the Agricultural Chemical Dept. retired April 1, but will remain with the company as a consultant.

California Institute of Technology. Dr. Paul D. V. Manning on July 1 will become professor of chemical engineering at CIT. On June 30 he will retire from his position as senior technical vice president, International Minerals & Chemical Corp. after 17 years service, in accordance with the company's retirement program.

Climax Molybdenum Co. New manager of agriculture sales and development is William M. Stilwell. Since joining Climax in 1955, Stilwell has been concerned with chemical market development, including work on the firm's agricultural program.

Stilwell

Columbia-Southern Chemical Corp. Appointment of J. E. Burrell as general manager of operations is announced by Jeseph A. Neubauer, president. Burrell succeeds the late Robert L. Hutchison who served as vice president in charge of operations. Prior to this appointment, Burrell served as assistant to the vice president in charge of operations. He joined C-S at Barberton, Ohio, as a research and development engineer in 1941.

Burrell

Commercial Solvents Corp. Three appointments as district managers have been announced: Walter A. Bauer as manager of the Cleveland District Office; Robert W. Breidenbach as manager of the St. Louis District Office succeeding Bauer; and Bernard F. Nachtman as Manager of the Chicago District Office.

Bauer joined CSC in 1952 as an industrial chemicals salesman and has served in Kansas City, Los Angeles and Chicago.

Breidenbach went to CSC in 1948 and has been with the industrial chemicals and agricultural chemicals departments.

Starting as an industrial chemical salesman in May 1947, Nachtman was named manager of the Cleveland office in October 1951, a post he held at the time of his new appointment.

Escambia Chemical Corp. John B. Clopton has been named director of sales, R. U. Haslanger, president announced. Clopton has been in the sales organization since early last year. His office is in the company's New York City headquarters.

Clopton

Food Machinery and Chemical Corp. William N. Williams and Jackson V. Vernon have been named members of the Chemical Divisions Executive Committee. Williams will have functional responsibility for engineering and manufacturing in FMC's Chemical Divisions, moving up from his former position as manager of the Westvaco Mineral Products Div. Vernon moves up from his previous position as manager of the Niagara Chemical Div. and will have functional responsibility for marketing and distribution in FMC's Chemical Divisions.

Williams

Vernon

Stuart H. Bear has been appointed manager of the Niagara Chemical Div. succeeding Vernon, and replacing Williams as manager of Westvaco Mineral Products Div. is Raymond F. Moran.

Jackson B. Hester Agr. Research Laboratories. Henry I. Wohl, former head of the Agricultural Dept. of St. Martin's College, Olympia, Wash., has joined the Hester Laboratories. Wohl studied in Germany and Switzerland and received his MS degree in Agronomy from the University of Wisconsin in 1948.

International Minerals & Chemical Corp. Jervis J. Babb,

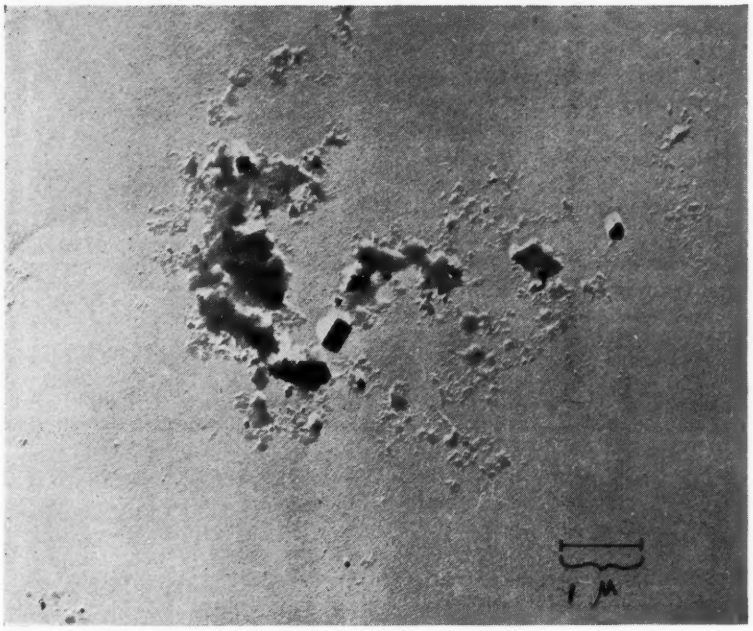
for **BEST** *uniform results*

use TAKO *with confidence*

QUALITY & SERVICE SINCE 1939

(*the natural colloidal kaolinitic kaolin*)

TECHNICAL FACTUAL INFORMATION THROUGH RESEARCH



Electronphotomicrograph, TAKO

Magnification 4 (Negative, 5100 diameters; print, 15,000 diameters). On the print, 1mm corresponds to 0.067 microns. Distinct rectangular forms are observed in the range from 0.07 to 0.4 microns in length. Less definite evidence is seen for particles of still smaller size.

pH Value 4.4
Bulk Density—lbs. cu. ft.
Loose—Approx. 20 lbs.
Packed— " 41 "
Porosity 130%
Specific Surface—(CM^2-22,700)
Particle Type—Crystal Flat Rectangular Plates and Crystal Aggregates
Specific Gravity—2.62
Particle Size Distribution—Sedimentation, using Andraesen Pipette Procedure

SIZE (Microns)	EQUAL or FINER %	GROUP %
.5		54.0
.5	54.0	
1.0	64.0	10.0
2.0	75.6	11.6
3.0	81.9	6.3
4.0	85.5	3.6
5.0	87.6	2.1
6.0	89.9	2.3
7.0	91.8	1.9
8.0	92.7	0.9
9.0	93.8	1.1
10.0	94.3	.5
10.0		5.7

ABSOLUTELY

NO MICA

GUARANTEED LESS 1% FREE MOISTURE

"TAKO" **Airfloated Colloidal Kaolinitic Kaolin is a natural practically chemically pure inert colloid with exceptional qualities. It excels as a diluent-carrier in formulations of insecticides-pesticides and as a prilling and coating agent in the production of high analysis fertilizers. It gives increased workability-dispersion. Its purity is highly desirable due to its compatibility with chemicals. Its colloids give increased adhesive-adsorptive properties.**

"TAKO" **used in large tonnage for years most successfully and economically as a diluent-carrier in the formulation of insecticides-pesticides and as a prilling and coating agent in the production of high analysis fertilizers.**

"TAKO" **—This Natural Very Pure Colloidal Kaolintic Kaolin is produced from our Company-owned mines, processed under straight-line production with the very latest electric controlled automatic equipment—resulting in our very low per ton established price for this high quality colloidal product.**

NON-ABRASIVE • NON-HYGROSCOPIC • NON-CAKING • FREE-FLOWING

"TAKO" Is Produced Under Laboratory Control—ALWAYS UNIFORM IN QUALITY
IT WILL PAY TO INVESTIGATE "TAKO" FOR YOUR REQUIREMENTS

THE THOMAS ALABAMA KAOLIN COMPANY

2412 KEN OAK ROAD, BALTIMORE 9, MARYLAND, U. S. A.
Mines, Plants & Shipping Point—Hackleburg, Alabama

FARM CHEMICALS People

board chairman of Lever Brothers, and Vernon Taylor, Jr., Denver financier, have been elected to the board of directors of IMC. They replace Thomas S. Lamont of J. P. Morgan & Co. and Vernon Taylor, Sr. of Peerless Oil & Gas Co. who resigned to devote more time to personal interests.

Dyer

PHOSPHATE CHEMICAL DIV. H. Clair Dyer becomes district sales manager of special products in a five-state area including Michigan, Wisconsin, Illinois, Indiana and Kentucky. Richard V. Falck has been named district sales manager in the special products department with headquarters in Arlington, Tex.

PLAND FOOD DIV. Frank H. Gildner, Jr., has been appointed agricultural and sales promotion supervisor for the Plant Food Div. and Potash Agricultural Dept.

Donald Lerch, Jr. & Co. Donald L. Miller, director of information of the National Agricultural Chemicals Association for the past three years, has joined the Lerch firm as director of editorial and special services. The company "provides marketing, editorial and Washington services" for clients in the fields of animal and plant health, farm chemicals, farm machinery, commodity markets, dairy production and marketing and foreign trade.

Miller

Pennsalt of Washington Div., Pennsalt Chemicals Corp. William S. Formwalt, Pennsalt's agricultural chemicals general manager, reports that William DeBusk has been assigned to the new post of assistant southern manager, agricultural chemicals. DeBusk's new duties will include the supervision of Pennsalt's Montgomery, Ala., operations.

Pittsburgh Coke & Chemical Co. New market research manager is Frank T. Cunniff, who will be responsible for marketing research studies on products and programs under consideration by the company's Chemical Group.

Retzloff Chemical Co. R. L. Holtzendorf has been assigned to sales technical service and new product development work.

Sinclair Chemicals, Inc. John J. Portz has been named sales representative for the Nitrogen Products Div. and Maurice E. Peterson, national accounts representative for the division.

Portz

Peterson

Stauffer Chemical Co. Archie E. Albright, assistant to the president, has been elected a vice-president. A graduate of Wittenberg College and Yale Law School, he joined Stauffer in 1953.

Also elected at the recent directors meeting was James W. Kettle as treasurer. He will continue to serve as controller. The directors accepted with regret the resignation of Christian de Dampierre as treasurer. He will continue as a director.

Albright

Kettle

Swift & Co. William J. Chapin, former general sales manager for southern plant food units, has been appointed head of the General Feed Dept.

The Texas Co. Walter W. Whitlock joins the Petrochemical Sales Div. as a sales engineer, with headquarters at the company's regional sales office in the McCormick Building, Chicago. He will give technical assistance to ammonia and nitrogen solutions users.

Whitlock

Union Carbide Chemicals Co., Div. of Union Carbide Corp. Assignment of John D. Mueller, Crag agricultural chemicals sales representative, to cover the Mississippi Delta area has been announced. He will headquarter at Memphis, Tenn., concentrating on market development of the new Sevin experimental insecticide.

Mueller

U. S. Industrial Chemicals Co., Div. of National Distillers and Chemical Corp. Paul J. La Marche has been made director of production. He will be located at the company's New York office. Since he began with National Distillers in 1949, he has been manager of sodium sales and plant manager at Ashtabula, O.

LaMarche

FARM CHEMICALS

Government

NEW CHEMICALS, DISEASES, FARM PRACTICES PROMISING AGAINST PINK BOLLWORM

Six chemical compounds, several bacteria and fungi, a nematode and various cotton-growing practices are due for closer study this year as possible weapons against the pink bollworm, USDA says. Attempts to colonize insect enemies of this pest have been abandoned, and a continuing search for attractants and repellents has so far been fruitless.

These are highlights of the state-USDA-industry research program spearheaded by scientists of USDA's Pink Bollworm Research Laboratory at Brownsville, Tex.

Six of the 31 chemical compounds laboratory-tested last year will be further field-tested in 1958 in the search for more effective and economical insecticides against the bollworm. Sevin, an insecticide first field-tested in Texas and Mexico last year, gave outstanding control of both the pink bollworm and the boll weevil, says USDA, and looks promising against several other cotton pests. Enough of this chemical will be available this year for large-scale field testing, and entomologists hope later to be able to recommend it, in addition to the now-recommended DDT and Guthion, for pink bollworm control. Cost-wise, DDT continues to be the "most satisfactory insecticide for use against this pest."

Six species of fungi and one of bacteria were highly destructive to the pest in the laboratory, and an insect-destroying nematode showed enough promise both in laboratory and limited field tests to warrant further study. The next step is to see if these pathogenic organisms can be put to work in cotton fields.

Fall burial or plow-under of bollworm-infested cotton bolls and trash was found to be the best cultural method of killing the pests in five years of testing in Texas and Oklahoma. Spring plowing-under proved less effective.

Basic life processes of the insect also are under intensive study. Analyses of amino acids, sugar, fat, water and overall weight show differences between non-hibernating and hibernating larvae. Pink bollworms used in these experiments live on potted cotton plants in cabinets where temperature, humidity and light can be varied to simulate various climates and seasons. Such information may open new approaches to the control problem. For example, USDA continues, if factors influencing hibernation are understood, scientists may be able to prevent bollworms from entering hibernation, and thus cut their chances of surviving the winter.

INSECT CONTROL PAYS OFF 23 TO 1

For each dollar spent by Colorado farmers for insect control in 1957, they realized a return of $23, according to a recent report from the Colorado Agricultural Experiment Station.

Growers of potatoes, tomatoes, wheat, lettuce, corn and beans in the state spent a total of $1,084,000 to prevent insect damage, the report says, and by so doing gained an estimated $23,368,000 in value of undamaged crops. The report further points out, however, that insects caused losses exceeding $7 million to unsprayed crops.

FIRE ANT QUARANTINE IN PARTS OF EIGHT STATES

USDA reports that effective May 6, 92 counties and parishes and parts of 49 additional counties in eight states are being regulated under a USDA quarantine because of infestations of the imported fire ant.

The states affected are Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina and Texas.

ICA AUTHORIZATIONS FOR FERTILIZERS

Turkey. $90,000—phosphate rock (PA 77-99-LI-8253, Code 2351). Contract period: March 31 to Nov. 30, 1958. Source: World wide. Terminal delivery date: March 31, 1959.

Vietnam. $525,000—phosphate fertilizer materials ($500,000) and prepared phosphate fertilizer mixtures ($25,000). (PA 30-235-99-LI-8037). Contract period: March 31 to July 31, 1958. Source: World wide. Terminal delivery date: Oct. 31, 1958.

$500,000—nitrogenous fertilizer materials (PA 30-230-99-LI-8038). Contract period: March 31 to July 31, 1958. Source: World wide. Terminal delivery date: Oct. 31, 1958.

$200,000—potash fertilizers (PA 30-233-99-LI-8039). Contract period: March 31 to July 31, 1958. Source: World wide. Terminal delivery date: Oct. 31, 1958.

Barter provision applies on the latter three authorizations.

CHANGES IN GEORGIA GRADE RECOMMENDATIONS

The Soil Management Committee of the University System of Georgia has reported plans to make the following changes in their grade recommendations for 1958–59 fertilizer year:

Substitute 6–12–12 for 5–10–10 (5–10–10 to continue on list for one year more and then be dropped); substitute 6–12–6 for 5–10–5; 0–14–14 for 0–12–12 and delete 0–16–8.

Changes in tobacco grades are reported under consideration.

FARM CHEMICALS — Associations & Meetings

ANNUAL FERTILIZER CONFERENCES IN ALA.

The annual conference held by the Alabama Experiment Station for the fertilizer industry will be held July 29 and 30, reports Howard T. Rogers of the Department of Agronomy and Soils.

On Tuesday, July 29 an indoor program at the Black Belt Substation near Marion Junction will consist of a series of short talks designed to stimulate discussion and questions from the audience. A tour of the station will follow the indoor program.

The next day, July 30, the conference will continue at Prattville Experiment Field, where field experiments will be toured and discussed.

KENTUCKY FERTILIZER CONF. ON JULY 30

Kentucky's Annual Fertilizer Conference for manufacturers, salesmen, dealers and others interested in the distribution of fertilizers in the state is scheduled for July 30 at Greenville.

Bruce Poundstone, head of the Department of Feed and Fertilizer at the Agricultural Experiment Station, said that the program will include a tour of the experiment field and conclude with talks on fertilization problems. A barbeque lunch will be served at noon.

CALENDAR

May 15-23. Fertilizer meeting series sponsored by Virginia Polytechnic Institute Agr. Ext. Service: May 15—Blacksburg; May 21—Piedmont Research Station, Orange; May 22—Eastern Va. Research Station, Warsaw; May 23—Southside Research Station, Charlotte.

May 19-21. Chemical Specialties Mfrs. Assn. midyear meeting, Netherland Plaza Hotel, Cincinnati, Ohio.

May 22-23. First annual meeting, Soil Science Society of North Carolina, Williams Hall, N. C. State College, Raleigh.

May 25-29. Air Pollution Control Assn. annual meeting, Sheraton Hotel, Philadelphia.

June 4. Fertilizer Safety Section, National Safety Council, Executive Committee Meeting, Hotel Roanoke, Roanoke, Va.

June 9-11. Association of Southern Feed and Fertilizer Control Officials, Heart of Atlanta Hotel, Atlanta, Ga.

June 12. Fertilizer Safety Executive Comm., Hotel Roanoke, Roanoke, Va.

June 12-14. Manufacturing Chemists' Assn. annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 15-18. National Plant Food Institute, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 18-19. American Grassland Council annual meeting, North Carolina State College, Raleigh.

June 25-27. Pacific Branch, Entomological Society of America, San Diego, Calif.

July 8-10. Pacific N. W. Fertilizer Conference, Pocatello, Idaho.

July 18-19. Southwest Fertilizer Conf. and Grade Hearing, Buccaneer Hotel, Galveston, Tex.

July 30. Annual Kentucky Fertilizer Conference, Greenville, Ky.

Aug. 20-24. Canada Fertilizer Association annual meeting, Manoir Richelieu, Murray Bay, Que.

Sept. 15-19. Instrument-Automation Conference and Exhibit, Philadelphia, Pa.

Oct. 14-15. Western Agricultural Chemicals Assn. annual meeting, Villa Hotel, San Mateo, Calif.

Oct. 20. Sales clinic of Salesmen's Association of the American Chemical Industry, Roosevelt Hotel, New York City.

Oct. 20-21. Fertilizer Section, National Safety Council annual fall meeting, LaSalle Hotel, Chicago.

Oct. 22-24. Pacific N. W. Plant Food Assn. annual meeting, Gearhart, Ore.

Oct. 28-29. Northwest Garden Supply Trade Show, Masonic Temple, Portland, Ore. •

Oct. 29-31. 25th annual meeting National Agricultural Chemicals Assn., Bon Air Hotel, Augusta, Ga.

Nov. 9-11. Calif. Fertilizer Association 35th annual convention, Ambassador Hotel, Los Angeles.

CORN CLUB CONTEST SET UP IN WASHINGTON

"Picking the Winners" will be the job of the Corn Club Committee. Some of the Yakima County Committee above are Sid Martin, Yakima Valley Spray; John Keene, county agent; Warren Marshall, Shell Chemical; and Ray Whiteon, Bleyhl's Aqua Grow.

Initial committee meetings were held recently to set up a Five-Acre Corn Club Contest in the irrigated corn area of Washington State. Sponsored by the state extension service and the National Plant Food Institute, the preliminary meetings were attended by people from the chambers of commerce, banks, Kiwanis, fertilizer and seed dealers, corn seed companies and other groups.

Among the purposes of the Washington Five-Acre Corn Club are to demonstrate the possibilities of lowering the unit cost of production of corn and to assimilate information on present practices used by corn producers to determine what will increase yields per acre in present corn growing counties.

NORELCO DIFFRACTION SCHOOL IN JUNE

The thirtieth Norelco X-ray Diffraction School for chemists, metallurgists, physicists, production supervisors, quality control engineers and others interested in methods of analysis, will be held at the Edgewater Beach Hotel, Chicago, during the week of June 2–6, 1958. Philips Electronics, Inc. held the 29th school in New York during February, 1958.

Basic subjects to be covered in Chicago include X-ray diffraction, diffractometry and spectrography.

Arcadian® News

Volume 3 | For Manufacturers of Mixed Fertilizers | Number 5

How to Make More Money from Mixed Fertilizers

For Greater Profit – Put More N in N-P-K

Most of the leading fertilizer-consuming crops require more nitrogen than any other plant food. Yet, the average mixed fertilizer contains less nitrogen than phosphoric acid and potash. Farmers make up the difference with extra applications of straight nitrogen materials. More nitrogen is sold as straight materials than in mixed fertilizers.

This situation represents a golden opportunity for you as a manufacturer of mixed fertilizers. You can get more of the nitrogen market and more of the total fertilizer market by putting more nitrogen in mixed fertilizers.

Profitable Arithmetic

You help the farmer save money and you make more money from nitrogen, when you sell it as an ingredient of mixed fertilizers. You get more of the farmer's fertilizer dollar when you supply his nitrogen needs with mixed fertilizers than when you sell him low-nitrogen mixtures that must be supplemented with extra applications of nitrogen.

Figure it out for yourself! Compare your profit per unit of nitrogen in straight materials with your profit per unit of nitrogen in mixed fertilizers. You will quickly see where your profit lies. And some of your customers may buy their mixed fertilizers from you and their straight nitrogen elsewhere. This means that your profit goes elsewhere.

The Aim and Purpose

Of course, it is not practical to supply all the nitrogen needs of some crops on some soils with mixed fertilizers. But, for most crops on most soils, it is practical, efficient, economical and profitable to supply total plant food

(Continued on following page)

(Continued from preceding page)

needs (including sufficient nitrogen) with mixed fertilizers.

The Aim and Purpose

The basic aim and purpose of "complete" fertilizer is to give the farmer, in one well-conditioned product, all the plant foods that his soil needs to produce the yields he wants. With a well-balanced fertilizer, he can feed his crop with one trip across his field.

When mixed fertilizer contains sufficient nitrogen, it may not be necessary for the farmer to side-dress or top-dress with supplemental nitrogen. This saves him time, labor and equipment and prevents soil compaction by keeping heavy machinery off his plowed and planted fields. Inability to apply extra nitrogen, due to bad weather or lack of time, cannot hurt his yield.

Farmers Know Advantages

More and more farmers are learning the advantages of high-nitrogen mixed fertilizers. Many experiment stations are recommending 2-1-1, 1-1-1 and 1-2-2 ratios. There is a growing demand for such mixtures as 16-8-8, 14-7-7, 12-12-12, 10-10-10 and 6-12-12. Farmers know that most crops use twice as much nitrogen as phosphoric acid . . . and more nitrogen than potash, especially where crop residues are plowed back.

The Big Picture

Despite widespread recognition of the obvious need for more nitrogen, the average mixed fertilizer contained 5.39% nitrogen, 12.08% phosphoric acid and 11.2% potash in the 1955-56 fertilizer year. Yet there was a definite trend toward high-nitrogen fertilizers during a year when total mixed fertilizers remained stable.

Mixed fertilizers used in 1955-56 contained 815,000 tons of nitrogen, while straight materials accounted for 1,137,000 tons. This is in contrast with 1,789,000 tons of phosphoric acid and 1,671,000 tons of potash in mixed goods versus 457,000 tons of phosphoric acid and 218,000 tons of potash as straight materials.

You help your dealer get exclusive customers and repeat sales when you supply the farmer's complete plant food needs with mixed fertilizers.

Bigger Profits

You sell more plant food at better profit, when you build your leadership among farmers as a dependable source of supply for mixed fertilizers that supply the complete plant food needs of crops.

When you balance your mixed fertilizer with adequate nitrogen to meet crop requirements you also insure the best possible return from the phosphorus and potash present. This means more farmer satisfaction and more repeat business for you.

You can increase the farmer's profit, your dealer's profit and your own profit, by manufacturing and selling complete fertilizers that contain plenty of nitrogen in balance with other plant foods.

More Dollar Volume

By producing higher-nitrogen mixed fertilizers, you can put a greater dollar volume of tonnage through your plant. You also make substantial savings in storing and shipping costs per unit of plant food. These costs are becoming more important with increasing freight rates and the necessity to warehouse more

PLANT FOOD CONTENT OF CROPS

Crop	Yield	Part of Crop	N lbs.	P_2O_5 lbs.	K_2O lbs.	Total
COTTON	750 lbs.	lint				
	1,250 lbs.	seed	60	30	20	110
	2,000 lbs.	burrs, leaves and stalks	45	15	45	105
	Total		105	45	65	215
CORN	100 bu.	grain	90	35	25	150
	3 tons	stover	70	25	95	190
	Total		160	60	120	340
WHEAT	40 bu.	grain	50	25	15	90
	1.5 tons	straw	20	5	35	60
	Total		70	30	50	150
OATS	80 bu.	grain	50	20	15	85
	2.0 tons	straw	25	15	80	120
	Total		75	35	95	205

off-season production to meet peak requirements.

One Sale—One Package

You enable your dealer to make better use of his storage and trucking facilities. With high-nitrogen mixed fertilizers, he can haul a higher value pay load and have less storage cost per dollar of inventory. You also help your dealer to supply the farmer with his plant food requirements in a one-sale, one-package deal. This reduces selling cost and minimizes the danger of losing business to a competitor.

Greater Benefits

High-nitrogen mixed fertilizers save the farmer handling and application costs and increase his efficiency. You supply him with plant foods that are chemically hitched and balanced so that he gets greater benefits from everything in his fertilizer. Also, high-nitrogen fertilizers help to take the guesswork out of farming.

It Pays Many Ways

Start now to supply more of your customers' complete plant food needs with mixed fertilizers. Make sure your analyses include plenty of nitrogen. It pays many ways!

How to Put More Nitrogen into Mixed Fertilizers

New ARCADIAN® Nitrogen Solutions now make it easier than ever before to produce high-analysis, high-nitrogen mixed fertilizers in regular equipment.

17% to 30% More Nitrogen

URANA® 6 and NITRANA® 4M Nitrogen Solutions are high in nitrogen and low in free ammonia. These ARCADIAN Solutions, plus sulphate of ammonia, are enabling mixers to put a high-nitrogen content into good quality mixed fertilizers. They decrease the need for nitrogen from other sources.

These Solutions have low vapor pressure. The salting out temperature for URANA 6 is 35°F., just above freezing, and that for NITRANA 4M is 61°F. Now shipped in insulated cars, these Solutions are easy to handle. At the same ammoniation rate as other Solutions, they put 17% to 30% more nitrogen in mixed fertilizers.

It's easy to shift your regular ammoniation methods to the use of URANA 6 or NITRANA 4M. Get the facts from your Nitrogen Division technical service man. These Solutions make it practical to formulate high-analysis, high-nitrogen fertilizers in almost any plant.

	URANA 6	NITRANA 4M
Total Nitrogen	42.0%	41.0%
Anhydrous Ammonia	19.5%	19.0%
Ammonium Nitrate	66.3%	72.5%
Urea	6.0%	—
Water	8.2%	8.5%
Specific Gravity at 60° F.	1.178	1.194
Salting Out	34° F.	61° F.
Vapor Pressure at 104° F.	10 lbs.	7 lbs.

Proper selection of the correct nitrogen solution can help you produce high-nitrogen fertilizers with your regular ammoniating equipment.

Another Method

Some manufacturers prefer to get a higher nitrogen content by using URANA or NITRANA Nitrogen Solutions high in free ammonia. This can be done by adding sulphuric acid in the mixing process. It amounts to making your own sulphate of ammonia while you are formulating fertilizers.

Take Your Choice

Either of the above-described methods will produce good-quality fertilizers with real economy. The best method for you depends on plant equipment, cost of materials, and the actual ratios you wish to produce. Your Nitrogen Division technical service man can be helpful to you in selecting the method best adapted to your particular needs.

More Mixed Fertilizer Sales

Production of high-nitrogen mixed fertilizers will enable you to supply a bigger share of your customers' total plant food needs with mixed fertilizers. You will be diverting business from straight materials into more profitable mixed fertilizers.

For technical help on the production of high-nitrogen mixed fertilizers in your plant, contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y. This service is available to customers without charge.

HERE'S THE BIG LINE OF Arcadian® NITROGEN SOLUTIONS

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60° F	Approx. Vap. Press. at 104° F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	26
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.052	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
10	44.4	24.5	56.0	10.0	9.5	11.0	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.081	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.925	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.972	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	—

Other ARCADIAN® Nitrogen Products: UREA 45 • A-N-L® Nitrogen Fertilizer Ammonium Nitrate • American Nitrate of Soda • Sulphate of Ammonia

NITROGEN DIVISION

Allied Chemical

MAIN OFFICE: 40 RECTOR STREET, NEW YORK 6, N. Y., PHONE HANOVER 2-7300

Hopewell, Va., P. O. Drawer 131 ..... Cedar 9-6301
Ironton, Ohio, P. O. Box 98 ..... Ironton 8-4366
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St. Paul 4, Minn., 45 N. Snelling Ave. ..... Midway 5-9141
San Francisco 4, Cal., 235 Montgomery St. ..... Yukon 2-6840

READER SERVICE

FC

FREE INFORMATION to help you solve fertilizer, pesticide problems

Chemicals

107—SOIL FUNGICIDE

Advice on use and benefits of soil fungicides is offered in three new pieces of literature issued by Olin Mathieson Chemical Corp.'s Insecticides Products Dept. Two of the six-page folders, in color, describe the use of Terraclor on vegetables and crucifers. The third is a technical application bulletin for the treatment of damping-off or "soreshin" on cotton. They are available to you if you

CIRCLE 107 ON SERVICE CARD

108—ACETO OFFERS NEW CATALOG

Availability of a new 4-page catalog, revised to include over 100 organic intermediates which can be supplied in commercial quantities has been announced by Aceto Chemical Co. To obtain a copy

CIRCLE 108 ON SERVICE CARD

109—TAKO KAOLINITIC KAOLIN

TAKO airfloated colloidal kaolinitic kaolin excels as a diluent-carrier in formulations of insecticides and other pesticides, according to Thomas Alabama Kaolin Co. The material is said to be non-abrasive, non hygroscopic, non caking and free flowing. For more information on the material,

CIRCLE 109 ON SERVICE CARD

110—N SOLUTIONS IN FERTILIZERS

A technical booklet on nitrogen solutions for fertilizer manufacture has been published for the fertilizer industry by Sohio Chemical Co.

Designed for day-to-day use in plant operations, the booklet contains a 16-page section on manufacturing with nitrogen solutions, plus basic information on various N solutions.

A section discussing fertilizer manufacture provides information in selecting solutions, along with a review of such topics as: Uniformity of ammoniation and absorption, reversion, temperature, alkalinity and acidity, hygroscopicity and solubility, and the use of urea and other specific materials.

Other sections discuss granulation versus conventional mixing, considerations and calculations in formulation, and plant and personnel safety. Product information sheets on aqua and anhydrous ammonia as well as nitrogen solutions are also included.

For a free copy, fertilizer manufacturers may

CIRCLE 110 ON SERVICE CARD

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111—SONIC SIFTING MACHINES

"NoVo-Screen Sonic Sifting Machines" is the title of a 28 page booklet from United Specialties Co. The booklet explains how sound vibrations are applied to sifting and contains many illustrations of the company's sifting machines, among them a bridge machine in a fertilizer plant. Among the advantages claimed for NoVo sonic sifting machines are 1. all energy is utilized, 2. no shear forces, 3. full utilization of the screen areas, 4. full utilization of each individual mesh aperture, 5. intensity and amplitude of vibration are controlled with precision, 6. entirely dust-free operation and 7. no resonance effects. For your copy of the booklet

CIRCLE 111 ON SERVICE CARD

112—STREAM SPLITTER BULLETIN

A completely revised technical bulletin on compact, reliable stream splitters has been announced by Sprout, Waldron & Co., Inc. The bulletin describes a splitter designed for dividing a single stream of dry free-flowing material up to approximately ¼" ring size into two to eight separate streams. The unit is adaptable, says S-W, for all plants where continuous flow of materials must be divided accurately to a series of subsequent grinders, sifters or other processing and packaging machinery. For your copy of the bulletin, which includes close-up photographs, engineering drawings and specification tables,

CIRCLE 112 ON SERVICE CARD

113—IMPERVIOUS GRAPHITE RUPTURE DISKS

A new range of Impervite Rupture Disks has been designed for mounting in standard 300# A.S.A. flanges. They are being produced in six standard increments of 25 lbs. from 175 to 300 psi burst ratings by Falls Industries, Inc. The disks are suitable for use in any pressured or vacuum process to protect vessels against rapid or gradual buildup of overpressure. They also can be installed in conjunction with pressure relief valves, which limits product loss in event of rupture. A new bulletin which includes data on the newly developed 300# range is available by

CIRCLING 113 ON SERVICE CARD

114—ROTARY DRYERS AND COOLERS

An eight page bulletin, describing design features of rotary dryers, is available from Fertilizer Engineering & Equipment Co., Inc. Detailed component pictures and discussion of auxiliary controls and safety systems are included. To get your copy,

CIRCLE 114 ON SERVICE CARD

115—INDUSTRIAL BUCKET ELEVATORS

A new bulletin describing the Rex-Rated standard industrial bucket elevator line has just been released by Chain Belt Co. Simplified selection data to aid in proper choice of the equipment is included. Also described is the "balanced design" of the elevators whereby all components—chain, sprockets, take-ups, bearings, buckets and pulleys—are matched for their rated capacity. For your copy

CIRCLE 115 ON SERVICE CARD

116—AR-MET ROTAMETERS

Ar-Met rotameters designed for pressures up to 5000 psi and for flow rate equivalents up to 3,000 GPM of water are the subject of a new bulletin from Brooks Rotameter Co. The bulletin provides detailed constructional information, dimen-

sions and capacities. A guide to the selection of transmitting as well as point-of-measurement extensions for Ar-Met rotameters is included in the literature. A free copy of the eight-page bulletin is yours if you

CIRCLE 116 ON SERVICE CARD

Materials Handling

117—RAYMOND ELECTRIC TRUCKS

Raymond electric trucks designed for narrow aisle operations are pictured and described in a new bulletin from The Raymond Corp. The company's electric hand pallet truck has three speeds forward and reverse. The 4,000 lb. capacity truck weighs ⅓ less than conventional walkies and has good maneuverability because of short length and wide steering arc, says Raymond. The company also makes a straddle type tiering truck and reach fork tiering truck for double-face pallets. For literature,

CIRCLE 117 ON SERVICE CARD

118—DUAL CAPACITY LIFT TRUCK

Lewis-Shepard Products, Inc. reports development of a dual-capacity electric fork lift truck. Called the Model "E" Multi-Master, the truck has a standard capacity of 2,000 pounds at a 48-inch load length. By simply adding a quickly removable counterweight to the truck's rear, its capacity is doubled to 4,000 pounds at a 48-inch load length. Without the counterweight, the truck can operate on low-capacity floors or in highway truck bodies as a 2,000-pound fork-lift. But when a 4,000-pound capacity is needed in other areas of the building, the counterweight fulfills the need, according to its maker. For more information and descriptive literature,

CIRCLE 118 ON SERVICE CARD

119—SEVEN WAYS TO CUT COSTS

"Seven Ways to Cut Costs" is the title of a special booklet recently published by The Frank G. Hough Co. The booklet demonstrates the utility value of interchangeable front end attachments on Payloader tractor-shovels, Hough states, and photographs place all seven attachments on one basic machine. Action pictures demonstrate the material handling assignments that can be made to apply to each attachment. Condensed specifications for the HA and HAH Payloaders also are included. Free copies are available if you

CIRCLE 119 ON SERVICE CARD

120—LIFT TRUCK MAINTENANCE

A pocket-sized preventive maintenance service manual for lift truck owners and operators has been issued by Towmotor Corp. The booklet offers a 32-point check-list which helps users avoid unnecessary repairs and aids them in spotting trouble before it starts. The manual may be secured by

CIRCLING 120 ON SERVICE CARD

121—WIREBOUND PALLET BOXES

An eight-page illustrated brochure showing wirebound pallet boxes in use in industry and agriculture has been issued by the Wirebound Box Manufacturers Association. Illustrations show wirebound pallet bins in use as assembly, production, storage and intra-plant materials handling bins and for the shipment of bulk materials. For a copy,

CIRCLE 121 ON SERVICE CARD

Packaging

122—LITERATURE ON NEW VULCAN DRUMS

Two pamphlets prepared by Vulcan Containers Inc. describe specifications of new drums recently added to its line. One reviews the advantages of Vulcan's new 55 gallon tight head Uni-Drums which interlock because of slightly offset rolling hoops. Uses and accessories for open and tight head 55 gallon drums, single and double blade 55 gallon agitator drums, open and closed head 15 gallon drums, and 100 and 120 pound capacity open head grease drums are described in the second pamphlet. For both brochures,

CIRCLE 122 ON SERVICE CARD

Miscellaneous

123—MACHINE LOAD CONTROL

Tipptronic, Inc. has issued a two-page bulletin describing its recently developed machine load control, designed to protect equipment and machinery through automatic shut-off, automatic warning and/or continuous on-off operation. Photographs, external and internal wiring diagrams are included. For your copy,

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124—"FIRE CURED" PRESSURE TANK

A new "fire cured" pressure tank for water systems, said to offer high resistance to corrosion, is being marketed by The F. E. Myers & Bro. Co. The heavy steel surface of the new tanks is especially prepared and then coated with an epoxy plastic which is fire cured. The result, says Myers, is a high gloss finish which will not chip, crack or peel. Both inside and outside of the tank are treated. It is offered in 21, 42, and 83 gallon capacities in seven different models. For a free bulletin,

CIRCLE 124 ON SERVICE CARD

125—TRIGGER VALVE

Spraying Systems Co. has devised a new trigger valve for use with turn-handle type spray guns. The company assures users that positive shut-off is provided for pressures up to 800 psi. The valve is also supplied with adapters for directly connecting nozzles and extensions to make a spray gun. More information is yours if you

CIRCLE 125 ON SERVICE CARD

126—BROCHURE DESCRIBES INFRARED INSTRUMENTS

Beckman Scientific Instruments Div. reports it has a new brochure describing its low-cost infrared spectrophotometers. The bulletin emphasizes design and performance features of the instrument and lists the complete line of liquid, gas and solid sampling equipment available for the spectrophotometers.

For copies of the brochure

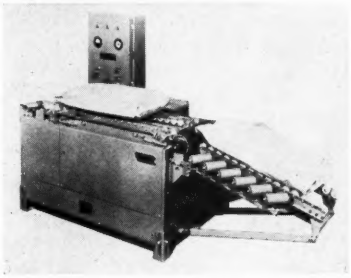
CIRCLE 126 ON SERVICE CARD

See pages 47 and 48 for information on these Reader Service Numbers:

127—Checkweigher
128—Hough H-25
129—Vibrating Screen
130—GunJet No. 22
131—Towmotor Fork Lift
132—Gear Pump
133—Magnetic Stirrer
134—Huber Densifier

FARM CHEMICALS
Equipment & Supplies

AUTOMATIC BAG AND CASE CHECKWEIGHER



Bags, cases and cartons from 20 lbs. up to 100 lbs. can be weighed in its new automatic case and bag checkweigher, the Selectrol Model 1250, reports Exact Weight Scale Co. The machine is designed for installation in a production line. Bags must be sealed and lying down on the conveyor, usually with the long dimension parallel to conveyor travel.

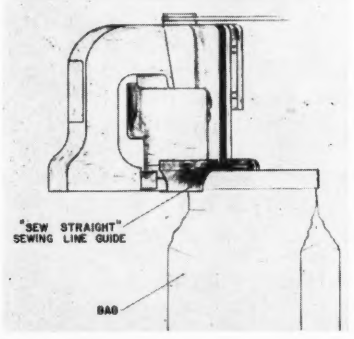
The Selectrol 1250 may be supplied with underweight rejection only or underweight and overweight rejection through the same reject channel.

For literature and detailed specifications,

CIRCLE 127 ON SERVICE CARD

"SEW-STRAIGHT" GUIDE FROM UNION BAG-CAMP

A new sewing line guide called "Sew-Straight" has been developed by Union Bag-Camp Paper Corp. Advantages of the guide, says the company, include improvement of package appearance because the guide insures a constant, uniform sewn top-closure, and greater available capacity since the closure may be sewn within one inch of the bag top.



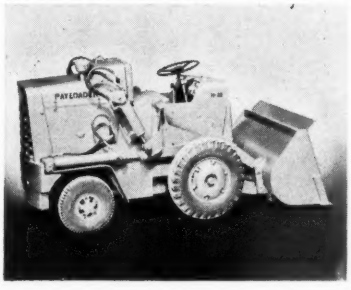
The sewing line guide is used in conjunction with an "E" type sewing head and does not reduce operating efficiency, according to Union Bag-Camp Paper.

HOUGH ADDS NEW MODEL WITH MORE CAPACITY

Production of an entirely new Payloader model, the H-25, has just been announced by The Frank G. Hough Co. It is the first rubber-tired, front-end loader with a rated carrying capacity of 2,500 lbs., and has new design features which are expected to establish new standards of production and ease of operation, according to the manufacturer.

The H-25 can be operated in and out of boxcars that have 6 foot doors, and has a turning radius of 6 feet to the outside rear hub. Power-steering is a standard feature. The power-shift transmission is full-reversing and has two speeds.

The new Payloader is being offered with a choice of gasoline, diesel or LPG power. For handling of dense, compacted materials, the H-25 has a breakout force of 4,500 lbs. and provides a bucket tip-back of 40 degrees at ground level. Maximum dumping height clearance is 5 feet, 4½ inches.

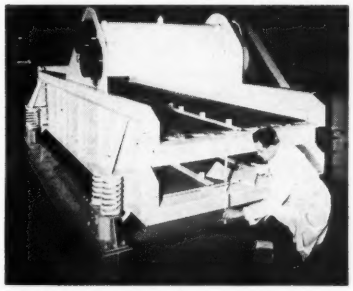


Descriptive literature and detailed specifications on the new model may be obtained by

CIRCLING 128 ON SERVICE CARD

HEAVY-DUTY HORIZONTAL VIBRATING SCREEN

A new heavy duty Straightline horizontal vibrating screen, CL-



Model 58, has been announced by Link-Belt Co.

Designed for dewatering, washing and sizing a wide variety of materials, where head room is limited, the horizontal screen can be cable suspended or floor mounted. Where conditions warrant, a combination of both mountings can be used.

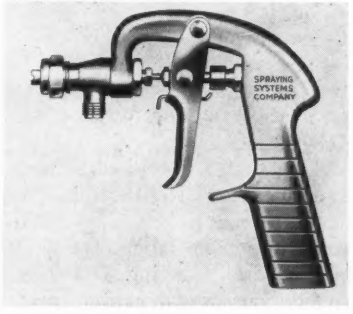
Additional information can be had by

CIRCLING 129 ON SERVICE CARD

"EXTERNAL" BODY, CAP & TIP FEATURED ON NEW GUNJET

In the new Spraying Systems GunJet No. 22, only a few parts of the gun actually come in contact with the chemical sprayed, says Spraying Systems Co. As a result, the company continues, use of costly chemical resistant materials can be restricted to these few parts and a high quality gun can be offered at relatively low cost.

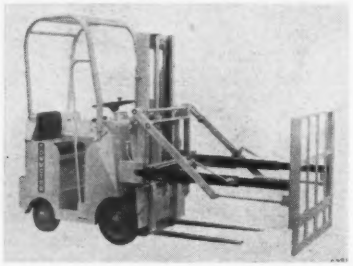
The trigger lock for continuous



spraying is engaged by slight pressure of the index finger and is automatically disengaged when the trigger is drawn completely back. The gun is designed for pressures up to 800 psi. A wide range of interchangeable orifice tips in brass and stainless steel are available. For complete information

CIRCLE 130 ON SERVICE CARD

NEW SAFETY FEATURES ON TOWMOTOR FORK LIFT



Fast loading and unloading of freight cars and trucks, plus rapid stacking of materials in storage, are the advantages claimed by Towmotor Corp. for its Model 350 fork lift truck equipped with hydraulic unloader accessory. The unloader pushes heavy loads from the forks of the lift truck into the exact position desired.

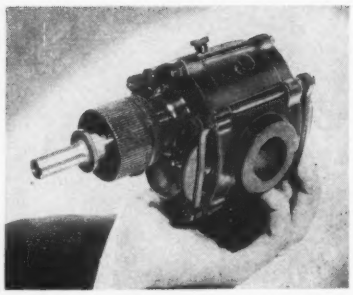
The truck also is equipped with a new style overhead guard designed for added driver safety and a water muffler of improved design, according to Towmotor Corp.

For more information,

CIRCLE 131 ON SERVICE CARD

HARD RUBBER GEAR PUMP HANDLES ACIDS, ALKALIES

For low-volume, positive-displacement pumping of acids, alkalies and other corrosives, the new Ace GKF gear pump features all-hard-rubber casings and gears, Kel-F bearings and rubber-covered shaft. Its manufacturer, American Hard Rubber Co., says that the pump is adaptable to many uses from laboratory work to process pumping. Typical applications are handling acids



from carboys and tanks, pumping from tank to process, pumping on acid tower work and direct agitation of plating or other solutions.

According to the manufacturer, the Ace hard rubber compound used in this pump is one of the most corrosion-resistant materials known. For details,

CIRCLE 132 ON SERVICE CARD

NEW MAGNETIC STIRRER HAS RIGID INTEGRAL CLAMP

Arthur S. LaPine & Co.'s newly designed laboratory magnetic stirrer has a rigid clamp cast integrally with the base which enables the stirrer to be mounted on a support rod or used on a bench top.

In operation, the shaded pole electric motor spins the Alnico V permanent bar magnet horizontally about the motor axis, and the plastic stirring bar in the vessel follows the rotating magnetic field—stirring without any mechanical coupling. The rheostat that controls stirring speed is mounted in the aluminum case of one model and contained

in its own separate enclosure in another.

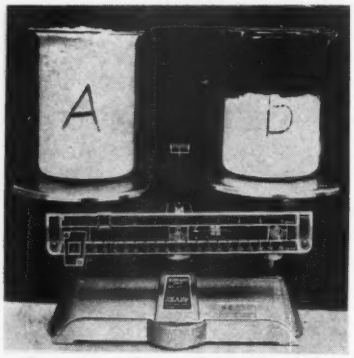
Diameter of the housing is 4¼" and total height is 3½".

For copies of a bulletin on LANCO magnetic stirrers,

CIRCLE 133 ON SERVICE CARD

HUBER DEVELOPS DENSIFIER FOR POWDERED MATERIALS

A new method plus equipment for de-aerating and compacting, or densifying, fine powdered materials have been developed by J. M. Huber Corp. According to Huber, the densifier makes possible the production of more salable, less dusty products with a uniformly higher density, and affords a positive way of reducing packaging materials and transportation costs.



Comparison of material at same weight shows reduction of bulk through use of densifier developed by J. M. Huber.

This equipment has all the advantages of a continuous process, including low power requirements and a minimum of operating supervision, Huber states. The process removes entrained or occluded air from fine, loose, powdered materials by the simultaneous application of vacuum filtration and mechanical compression to a regulated and continuously moving product stream.

It has been used for tonnage production of materials such as 75 per cent DDT concentrates, kaolin clays, metallic oxides and silica pigments.

Manufacture and use will be licensed by Huber to any interested company. In addition, the company has a pilot densifier for processing sample materials for study and evaluation. Complete information on the equipment and process may be obtained.

CIRCLE 134 ON SERVICE CARD

Presenting

THE MOST MODERN BAG PRINTER

Manufactured in

One, Two, Three and Four Colors for printing made up bags of Paper, Cotton and Burlap, new or used.

Let us send you complete information with descriptive literature.

SCHMUTZ MFG. CO.

18th and Main Streets
Zone 3
Louisville, Ky.

Cable Address "SCHMUTZ"—Long Distance Phone CLAY 7771

Suppliers' Briefs

Bemis Bro. Bag Co. Ray Potter Perry, manager of the Bemis Visinet Mill in St. Louis, has been named manager of the Minneapolis plant and sales division. He succeeds O. M. Smith, manager at Minneapolis since 1952, who died suddenly last Feb. 25.

Clark Equipment Co., Industrial Truck Div., has appointed three new dealers in Tennessee: Material Handling Equipment Co., Inc., Nashville; Valley Materials Handling, Inc., Knoxville; and Phelps Equipment Co., Chattanooga.

Chase Bag Co. J. R. Wible succeeds F. H. Rhoden as director of purchases. He has been with the firm since 1948.

Continental Can Co. The Containerboard and Kraft Paper Div. has set in motion its plans to enter the multiwall bag business with the appointment of D. Harold Johnson as manager of multiwall sales, Dean P. Stout, Division general manager of sales has announced.

Dodge Manufacturing Corp. Engineering Department changes: Alex T. Bodle becomes consulting engineer. He is succeeded as chief engineer by Jackson Chung. Donald P. Lower has been promoted to manager of engineering.

Dorr-Oliver. William J. Fox has been elected vice president for the field of technological growth, and Dr. Elliott J. Roberts has been named company technical advisor.

Fulton Bag & Cotton Mills. Appointment of Joseph G. Shedd as general manager of manufacturing is announced by Clarence E. Elsas, president.

St. Regis Paper Co. Net sales for 1957 were $360,965,010, compared with $370,034,372 in 1956. Net income for 1957 was $21,125,055, against the $25,349,948 earned in 1956.

West Virginia Pulp and Paper Co. Fulton Bag and Products Co. of New Orleans, La., is being absorbed through a cash transaction as a division of West Virginia Pulp and Paper, company officials have announced. Fulton Bag and Products operates plants at New Orleans and St. Louis.

West Virginia also reports that arrangements have been made to purchase two multiwall bag plants, those at Wellsburg, W. Va. and Mobile, Ala., from Arkell and Smiths. The sale, approved by the boards of both companies, still is subject to approval by Arkell and Smiths' stockholders.

LIQUIDATION SALE: 10—Louisville Rotary Steam Tube Dryers 6′ x 50′, 6′ x 30′, 6′ x 24′, located Kentucky. (Note: Tubes can be easily removed.) Priced for quick sale. Also Munson 100 cu. ft. Blender, Ribbon Mixers, Tanks, etc. PERRY, 1430 N. 6th St., Phila. 22, Pa.

A typical experience in the work-a-day lives of thousands of industries.
DOGGONE IT, PETE, THIS HAS GOT TO STOP!
PLANT MANAGER
. . . just came from the bag-filling department . . . Not a man wearing a respirator.
I'm not surprised, Jim. The men would rather breathe dust than wear heavy old respirators.
I know it. But I'm supposed to enforce safety rules. Oh, for a light, comfortable dust mask!
Here's what you want, men—The Flex-A-Foam Dust Mask—light as a feather!
It's sure light and comfortable, but can it do a man-size job?
It should. It filters non-toxic dust particles 100 times smaller than you can actually see.
Seen Purchasing yet? They're up on new developments.
Order a trial dozen, Bob. Maybe they'll wear these without continual prodding.
They're glad to wear Flex-A-Foam Dust Masks. Our troubles are over!
LATER
You're right! We should now equip the entire plant!
(quantity prices as low as $1.10)
Send Today
$1.45
(Industrial price only)
Try low cost FLEX-A-FOAM and judge proof by performance.
FLEXO PRODUCTS, INC.
Westlake, Ohio

FEEDING AND FERTILIZER MATERIALS

(SINCE 1898)

●

SAMUEL D. KEIM

1343 ARCH STREET

PHILADELPHIA 7, PA.

Production — January, 1958

Compiled from Government Sources

Chemical	Unit	January 1958	January 1957	December 1957
Ammonia, synth. (anhydrous)	s. tons	[4]321,937	302,504	317,199
Ammonia, byproduct liquor (NH_3 content)	s. tons	1,244	1,552	1,080
Ammoniating Solutions (incl. urea ammoniating sol.) 100%N	s. tons	40,578	[5]	[5]
Ammonium nitrate, fert. grade (100% NH_4NO_3)	s. tons	213,544	172,198	213,468
Ammonium sulfate				
synthetic (technical)	s. tons	[6]83,451	83,783	*83,160
byproduct	s. tons	57,759	80,772	62,644
BHC (Hexachlorocyclohexane)	pounds	———	7,836,225	———
Gamma content	pounds	———	1,236,403	———
Calcium arsenate (commercial)	s. tons	———	744	———
Copper sulfate (gross)	s. tons	5,620	5,704	4,084
DDT	pounds	———	10,878,405	8,869,530
2,4-D acid	pounds	———	3,042,246	3,049,179
esters and salts	pounds	———	2,427,334	2,189,081
esters and salts (acid equiv.)	pounds	———	1,758,410	1,665,846
Lead arsenate (acid and basic)	s. tons	———	1,095	765
Phosphoric acid (100% P_2O_5)	s. tons	[6]139,948	122,312	*123,418
Sulfur, native (Frasch)	l. tons	461,285	495,353	471,630
recovered[2]	l. tons	53,673	42,154	48,098
Sulfuric acid, gross (100% H_2SO_4)	s. tons	[7]1,351,177	1,386,063	*1,305,864
Superphosphate and other phosphatic materials (100% APA)	s. tons	220,881	219,855	*212,708
normal and enriched (100% APA)	s. tons	125,353	138,422	*117,992
concentrated (100% APA)	s. tons	74,318	65,484	*73,813
ammonium phosphates (100% APA)	s. tons	10,432	[3]	*10,539
other phos. fertilizers (incl. wet-base goods)	s. tons	10,778	[3]15,949	*10,364
2, 4, 5-T acid	pounds	———	286,064	307,220
Urea (total primary production)	pounds	———	84,360,000	99,102,017

*Revised. [1]Witheld to avoid disclosing figures for individual establishments. [2]Recovered sulfur of a purity of 97 per cent or greater. [3]Data for ammonium phosphates are included in other phosphatic fertilizers. [4]Includes data for 4 plants previously not reporting. [5]Not available. [6]Includes quantities for 2 plants previously not reporting. [7]Includes quantities for 3 plants previously not reporting.

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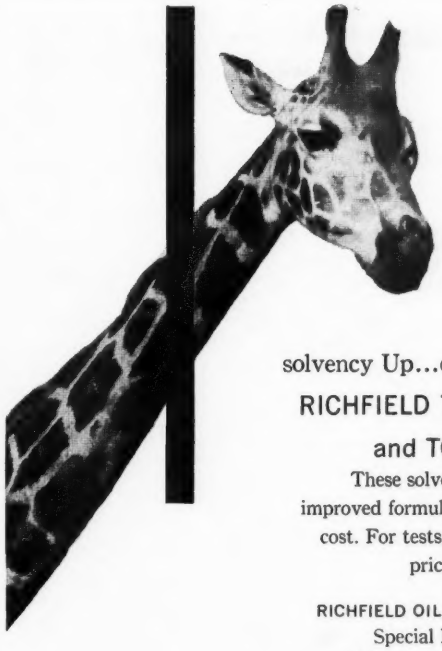

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5 PPM RESIDUE TOLERANCE, LABEL SET FOR TOXAPHENE

A tolerance of 5 ppm of toxaphene on barley, oats, rice, rye and wheat has been established by the Food and Drug Administration, according to Hercules Powder Company.

The label approval issued by USDA for toxaphene dusts and sprays states that toxaphene formulations may be applied up to within one week from harvest on wheat, rye, and oats, and up to within two weeks from harvest on barley and rice. According to Hercules, toxaphene is the only chlorinated hydrocarbon insecticide recommended for armyworm control that can be used this close to harvest. The new, more liberal regulations, the company says, give growers of small grains a weapon they can use from the time the crop germinates until late in the season with no danger of contamination.

KELTHANE MITICIDE TOLERANCES SET BY FDA

Residue tolerances have been established by the Food and Drug Administration for Kelthane, a miticide produced by Rohm & Haas Co. The announcement clears the use of Kelthane throughout the growing season on about 40 fruit and truck crops, according to the company. A tolerance of 5 p.p.m. is established for most of the crops on FDA's list, including stone and pome fruits and berries on which Kelthane can be applied up to one week before harvest. On citrus crops, peaches, apricots, and nectarines the residue tolerance is 10 p.p.m., and the miticide may be applied up to two weeks before harvest.

Kelthane is a chlorinated compound, chemically 1,1-bis(chlorophenyl)2,2,2-trichloroethanol. It is a contact poison with long acting residual toxicity. It is available as a wettable powder, an emulsifiable concentrate or as mixed dusts. The company reports that it is compatible with commonly used insecticides and fungicides.

Tests in more than 100 federal, state, and Canadian experiment stations have shown that Kelthane successfully controls a wide spectrum of mite species, including mites resistant to some other miticides.

STAUFFER INCREASES OUTPUT OF EPTAM

Stauffer Chemical Co. is moving its new selective herbicide, Eptam (E. P. T. C.) into larger scale production at Richmond, Calif., according to a recent release. During the past year, the company said, Eptam has been made in relatively small pilot plant quantities. With a new and much larger pilot unit, output will be increased substantially. This will provide an adequate supply of the herbicide for the expanded field testing and development program the company plans to conduct both nationally and in selected foreign countries.

Experimental work conducted since its development by Stauffer's Research Laboratories in 1955 indicates that many crops, ranging from forage legumes such as clover and alfalfa to vegetables such as corn, carrots and beets, are tolerant to the pre-emergence application of the new herbicide, says Stauffer.

Eptam currently is being evaluated as a 6 lb./gallon emulsifiable concentrate.

NEW DUPONT HERBICIDE TRYBEN BASED ON TBA

One spraying with "Tryben" 200 weed killer can eliminate bind-weed, Canada thistle, trumpet vine and many other tough broad-leaved perennials for a year or longer, reports DuPont Co.

The material is based on the dimethylamine salt of trichlorobenzoic acid (TBA), and contains two pounds of acid equivalent per gallon. Effective through both contact and residual action, DuPont says it fits into chemical weed control programs as a long-needed single treatment where both types of herbicidal action are required for complete long-lasting control.

The non-selective herbicide is formulated as a liquid to be diluted with water for spray application. Dosages of five to 10 gallons of "Tryben" weed killer per acre are recommended to kill established stands of deep-rooted perennials, states DuPont, while higher dosages (10 to 15 gallons per acre) will provide residual effects to prevent establishment of new seedlings, giving control of most perennial and annual broadleaf weeds for one year or longer.

Development of herbicidal uses of compounds based on trichlorobenzoic acid has been undertaken by DuPont for the past two years in cooperation with state weed control investigators in most states where deep-rooted perennial weeds are a problem. The company says that many successful trials have been made in widely scattered states, including Kansas, Nebraska, North and South Dakota, Minnesota, Texas, California, Oregon, Colorado, Iowa, Montana, Missouri and Wyoming.

DIPROPYLENE GLYCOL— ARAMITE STABILIZER

Dipropylene glycol, a well known solvent, has been shown in tests to be an effective stabilizer for Aramite pesticide dusts and wettable powders, reported Jerome Yaffe, senior chemist of the Niagara Chemical Division, Food Machinery and Chemical Corporation, at the American Chemical Society national meeting last month.

Yaffe told the Society's Division of Agricultural and Food Chemistry that "the degree of stabilization afforded depends upon the choice of glycol, the selection of diluent and the type of wetting agent, dispersant or other additives used. This necessitates that each formula be evaluated individually."

Tests have indicated that even in hot and dry regions when the temperature rises to 110 degrees F., the addition of 2 per cent dipropylene glycol greatly increases the stability of Aramite,

the chemist said. He described tests in which dusts and wettable powders were prepared by atomizing a mixture of the Aramite and the stabilizer onto the filler in a laboratory dust mixer. The resulting product was pulverized in a hammer mill and finally reblended. Each formulation was sealed in a glass jar and analyzed before and after various intervals of storage at 25 and 50 degrees C. in a constant temperature oven. Analytical techniques were employed to evaluate the effect of the glycol as a stabilizer, with special attention being given to temperature, acidity, moisture content and the components which accelerate the rate of decomposition.

All the glycols tested inhibited the decomposition to some degree. Propylene, dipropylene and polyethylene glycol 400 were the most effective, according to Yaffe.

The protection offered by the glycols, he said, "provides an insurance that the per cent of the active ingredient shown on the package will be present in the pesticide formulations and that the consumer will obtain as good results from a material aged for one or two years as from one which has just been prepared."

MALATHION CLEARED FOR STORED GRAIN

Malathion has been cleared by the Food and Drug Administration for direct application to stored grain, according to American Cyanamid Co. This new use follows clearance by the FDA permitting direct use of the product on meat type animals and poultry.

Extensive research here and abroad and practical use of malathion in Canada, where its application to stored grain has been permitted for almost two years, have established the chemical as a highly effective insecticide against the major pests that infest storage bins, Cyanamid reports.

FDA SETS NEW TOLERANCES FOR CAPTAN FUNGICIDE

A new tolerance for Captan, Stauffer Chemical Co.'s organic fungicide, has been issued by the Food and Drug Administration. A residue tolerance of 100 parts per million of Captan has been set on a broad range of crops.

In practice, Stauffer said that this means Captan (N-trichloromethyl-mercapto-4-cyclohexane-1,2-dicarboximide) may be used to spray or dust many food crops at any stage of their growth. Moreover, the company continued, the level of safety of the fungicide is such that it may be used as a post-harvest treating agent for a number of fruits and vegetables.

Such post-harvest treatments, by spraying, dusting or dipping, prevent deterioration of the produce from fungus infections which may develop in transit or storage, Stauffer reports.

FERTILIZER UPS PASTURE EFFICIENCY

Fertilized pastures can almost cut in half the amount of grazing land needed for young dairy heifers, according to recent research findings by the University of Minnesota.

Since the Minnesota experiment began in 1955, the fertilized pasture areas received 60 pounds of nitrogen and 40 pounds each of phosphate and potash each spring, plus 33.5 pounds of nitrogen top-dressing per acre in the summer, plus 4 tons of lime per acre the first year.

There was no difference in the amount of pasture used by iden-

(*Continued on page 54*)

UNION CARBIDE REPORTS ON SEVIN

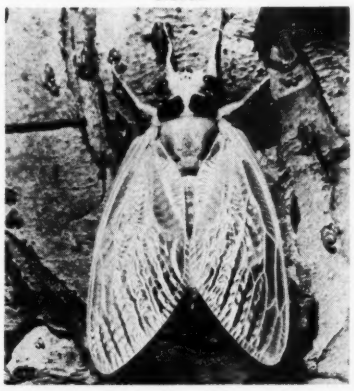
Test results reported by Drs. Castillo Graham and Elroy R. Krestensen, University of Maryland Field Station, Hancock, indicate Sevin insecticide has provided outstanding control of periodical cicada, the pest often called the 17-year locust, reports Union Carbide Chemicals Co., which recently introduced the material.

Graham and Krestensen recently published a paper in the Journal of Economic Entomology about cicada control tests they conducted in Washington County, Md. According to the scientists, "Sevin gave 100 per cent kill of cicadas caged on the limbs of trees for six days after treatment and remained highly effective for 10 days."

The experimental insecticide has been suggested for trial in the 1958 apple pest control schedule recommended by the New York State College of Agriculture.

The New York schedule suggests two pounds of Sevin 50 per cent wettable powder per 100 gallons of spray mixture for control of insects early in the season. Union Carbide says that applications of Sevin at the two-pound rate in the petal-fall, ten-day and first-cover sprays will control plum curculio (light infestation), fruit-tree leaf roller, European apple sawfly and first-brood red-banded leaf roller. Preliminary evidence indicates that two pounds of Sevin in summer sprays will also control apple maggot. In the summer program, the schedule lists Sevin 50 per cent wettable powder at one pound per 100 gallons of spray for control of codling moth and green apple aphids.

Cicada



Codling moth larva

(*Continued from page 53*)

tical groups of heifers on fertilized pasture compared to unfertilized areas in 1955. But in 1956, those on the fertilized pasture required only 62 per cent as much area as did heifers on unfertilized grass, and last summer it took twice as much area to feed the heifers on unfertilized pasture.

The Minnesota researchers also report that in 1957, the daily gains of heifers on fertilizer pasture averaged .94 pound compared to .64 pound on the unfertilized area. The fertilized pasture also is reported to have produced 436 pounds of heifer gain per acre in 1957, compared to only 148 pounds per acre on the unfertilized pasture. In these experiments, the heifers received no other feed.

2,4-D TRIED AS A GROWTH STIMULANT FOR RUBBER TREES

The chemical compound, 2,4-D, long used as an herbicide, is being used experimentally as a growth stimulant for rubber trees.

According to *Chemical News*, tests with 2,4-D in Malaya and Indonesia have increased latex yields 25 to 40 per cent, and also rejuvenated older trees, increasing their productive life.

Less than an ounce of the chemical is applied to each tree, mixed with a sirupy palm oil.

WHITE PINE WEEVILS CONTROLLED BY CHEMICALS

White pine weevils continue to threaten the valuable eastern white pine, but some control methods are proving effective, says the annual report of the U. S. Forest Service's Northeastern Forest Experiment Station, Upper Darby, Pa.

The adult weevil is a small elongated beetle with a brownish snout. It winters in the duff beneath trees. In March or April, eggs laid in the bark of leaders hatch within a week or 10 days.

It's this newly hatched weevil larvae that cause the damage. This stage feeds on the preceding year's branch leaders, burrowing beneath the bark and the outer wood. Once killed, the leader is replaced by a lateral branch, which often causes a crooked or forked tree to develop. Forks and crooks resulting from weevil attack greatly reduce the value of the lumber that can be produced from a tree.

Though white pine, especially in young plantations, is the favored host of this native pest, other trees are also attacked—Norway spruce, jack pine, pitch pine, and red spruce.

Emulsion sprays of Lindane, Endrin, Heptachlor, and Malathion, applied by knapsack sprayer to white pine leaders in early spring, gave excellent control of weevils as they emerged from hibernation. Even fall applications of Lindane plus extender were effective the following spring.

Applications of 2.0, 1.0, and 0.5 per cent Lindane plus equal parts of Aroclor were made in October 1956. Of 10,000 white pines treated, only one tree was weeviled by mid-July 1957. In unsprayed plantations nearby 25 per cent of the trees were weeviled.

Weevils can also be combatted while still wintering in the duff of the forest floor. Applications of granular Endrin (2 per cent), Aldrin (2 per cent), Dieldrin (2 per cent), and Heptachlor (2½ per cent) at rates of 1, ½ and ¼ pound actual insecticide per acre were made in the fall of 1956 to weevil-infested duff. Aldrin and Heptachlor at all dosages gave complete control.

But not all chemical applications are successful in fighting this destructive pest. Nearly a thousand acres of two weeviled pine plantations in northern New York were sprayed from the air with 4 pounds of DDT in 4 gallons of oil solution per acre. This test, conducted jointly with the New York State Conservation Department, resulted in weeviled trees averaging 6 per cent in one area and 7.5 per cent in the other—too high to be considered effective control.

U. S. RUBBER TO MARKET A "TRANQUILIZER" FOR PLANTS

Duraset-20W (N-Meta-tolyl phthalamic acid) will be marketed for use on selected crops for the first time this year, United States Rubber Co. has announced. The company says Duraset-20W increases plant yields by reducing the effects of shock and stress caused by such conditions as heat spells, sudden cold snaps, prolonged rain, drought or overfertilization.

It works in two ways, reports U. S. Rubber: When sprayed during blossom time it helps plants and trees retain fruit-producing blossoms in the face of poor growing conditions. Secondly, it more than doubles the usual number of blossoms formed by some plants, such as greenhouse-grown tomatoes, if sprayed when the plant is only a few weeks old.

In field tests, the chemical is said to have increased lima bean plant yields up to 90 per cent; doubled the amount of fruit formed on cherry trees; raised by one-third the number of fruit formed on pineapple-orange trees, a variety of orange, and increased yield of cotton plants from 10 to 30 per cent. Successful use on alfalfa, cranberries, pea beans, pears, snap beans, soybeans and strawberries also has been reported. Based on these yield increases, the company feels the chemical now is ready for full scale commercial grower tests on such crops as desert-grown cotton, lima beans, greenhouse tomatoes and Northwest cherries. Laboratory research and field testing will continue, however.

Researchers are not completely certain how the chemical works. They theorize that it corrects an auxin imbalance in plants. Just 24 hours after the plant is sprayed, it is impossible to detect as little as .2 ppm of the chemical in the plant.

Duraset-20W was jointly discovered by Dr. Allen E. Smith, chemist, and Dr. Albert W. Feldman, plant pathologist, of the rubber company's Naugatuck Chemical Div.

PEST REPORTS

Presented in cooperation with the Economic Insect Survey Section, Plant Pest Control Branch, Agricultural Research Service, USDA.

COTTON BOLL WEEVIL SURVIVAL COUNTS DOWN

SURFACE woods trash examinations to determine the number of boll weevils surviving the winter have been completed in Louisiana, Mississippi, Georgia, North and South Carolina and Virginia. In all cases the number of surviving weevils was markedly reduced from the number found entering hibernation last fall. The three parishes—East Carroll, Madison and Tensas—comprising the northeast Louisiana area showed an average survival count of 1,480 weevils per acre. This gave a winter survival rate of 18 per cent of the 8,043 weevils per acre found in hibernation last fall. Although the winter survival is much lower than in 1956, the population is not much lower due to the heavy fall population.

The percentage survival of the boll weevil in the areas studied in Mississippi were the lowest since records have been maintained. In the lower delta area 418 weevils were found surviving while 5,243 were found in hibernation last fall; in the central delta 551 and 6,269; the north delta 381 and 11,264; and the hill section 219 and 4,087.

The average percent of cotton boll weevils found surviving the winter in the areas surveyed in Georgia was 34 per cent. In the northwest section of Georgia, 97 surviving weevils per acre of woods trash were found; north central, 307; east central 968 and in the south 532 giving an average of 731 live weevils per acre for the four areas. The count for the number of weevils per acre found in hibernation during the 1957 fall survey in Georgia was 2,081.

The percentage reductions in the Carolinas-Virginia counts were very high. Boll weevil survival counts in the south central area of South Carolina were 457 while 3,978 were found in the fall hibernation survey; thus giving an 11.5 per cent survival. In the coastal Plains area of North and South Carolina survival was 403 weevils per acre with 11,374 fall hibernation for a survival of 3.5 per cent. In the Piedmont area of North and South Carolina, the survival was 296 against 6,752 found in fall hibernation for 4.4 per cent. The figures for north central North Carolina were 54 weevils surviving as against 2,205 in the fall hibernation survey or 2.4 per cent. Southeastern Virginia survival counts were 54 weevils per acre compared with 3,335 last fall in hibernation or 1.6 survival.

In the Florence County, South Carolina area an average of 538 weevils per acre were found surviving. Compared with the 7,693 found in the fall hibernation survey the percent survival was 6.9. Records have been maintained in Florence County since 1938; in only one year has the number of surviving weevils been fewer than found in the spring of 1958. In the 1940 survival survey, 176 weevils per acre were found.

GREENBUG REPORTED HEAVY IN SEVERAL SECTIONS

Although light in most areas, spotted heavy populations of the greenbug were reported from several sections during late March and early April. In Texas, infestations on small grains were spotted heavy through the North Central area of the state, medium to heavy in Brazos and Bowie Counties and light to heavy in other central eastern counties where the stand was killed in some fields.

Oklahoma reported counts up to 150 greenbugs per linear foot of wheat in scattered fields in the Hennessey area of Kingfisher County. Considerable spraying had been done. Light counts were reported from the majority of the fields in the south central Oklahoma counties but populations up to 500 per linear foot were reported from Cleveland County, 250 in Carter County and 300 in Love County. Light damage was noted in a few fields but both lady beetles and fungus were found active on the aphid in some areas. No greenbug activity was found in Kansas. Activity was light in New Mexico. Populations of 10–15 per 10 sweeps were found in fields of oats, wheat and vetch in Lee, Macon and Russell Counties, Alabama. Light populations were also reported from three Louisiana Parishes.

BEET LEAFHOPPER POTENTIALS HIGH FOR SOUTHERN GREAT PLAINS

The survey to determine the overwintering populations of the beet leafhopper in the spring breeding areas was conducted in late February and early March 1958. The beet leafhopper is the carrier of the virus that causes wilt or curley top in beets, tomatoes and other crops. Hoppers from the area surveyed can affect crops in eastern New Mexico, western Texas, western Kansas, and eastern Colorado.

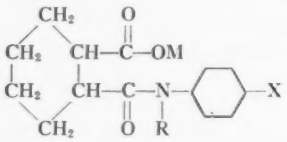
The survey showed the overwintering adults of this insect and its host plants to be more abundant and widespread than in any of the past 5 years. Current indications are that the number of spring-generation leafhoppers that will move from the spring breeding areas of the Edwards Plateau and adjacent plains area of Texas into cultivated districts of eastern New Mexico, the South Plains and Panhandle of Texas and the Arkansas River Valley of Kansas, and Colo. will be the largest since the study was begun in 1954.

Patent Reviews

By Dr. Melvin Nord

HERBICIDES

U. S. 2,821,467, issued Jan. 28, 1958 to Norman J. Lewis and assigned to Monsanto Chemical Co., discloses a new class of general herbicides, i. e. 2-(p-halophenyl carbamyl)-cyclohexane carboxylic acids and their salts, having the structure



where X is halogen, M is hydrogen or a salt-forming radical, and R is hydrogen or alkyl.

These compounds are prepared by the reaction of hexahydrophthalic anhydride with p-haloaniline or an N-alkyl p-haloaniline.

The preferred amount for herbicidal use is in the range of 2 to 15 pounds per acre.

TREATMENT FOR IMPURE CALCIUM NITRATE

U. S. 2,819,955, issued Jan. 14, 1958 to Willem Slot, assigned to Stamicarbon N. V., describes a continuous process for converting impure calcium nitrate-tetrahydrate crystals having an acidic reaction and containing acid phosphorus-containing ions into solid calcium nitrate fertilizer.

The crystals are first dissolved, forming an acidic calcium nitrate-containing liquor. The acidity of this liquor is reduced in a single stage by introducing a stream of the liquor and a stream of ammonia simultaneously and continuously into a reaction vessel provided with an overflow, and maintained at a temperature above 60°C. The relative amounts of acidic liquor and ammonia supplied are adjusted to maintain a *p*H value of the liquor in the reaction vessel between 4 and 5. Any precipitate formed in the reaction vessel is then relatively small and readily filterable.

The overflow reaction product is then treated to remove the precipitate. The remaining solution is then concentrated into a solid calcium nitrate fertilizer product.

COMPOST PREPARATION

U. S. 2,820,703, issued Jan. 21, 1958 to Wilfred C. Dresser and Robert D. Jacobson, assigned to American Cyanamid Co., describes a method of composting organic waste material.

A quantity of partially composted organic material is mixed as inoculum with a quantity of substantially undecomposed organic material, and the mixture is allowed to digest until the chemical oxygen demand of the mixture has decreased substantially. The resulting mixture is then divided into two portions, part being recycled as inoculum for more undecomposed organic material, and the remainder is mixed with an inoculum consisting of organic waste material which has a lower chemical oxygen demand (obtained as recycle from succeeding stage of the process). This mixture is then allowed to digest until it has a substantially lower chemical oxygen demand.

The process is repeated through a number of succeeding stages, with inoculum recycles, until the final compost is obtained, thus, in effect establishing a countercurrent recycling system.

PHOSPHATE FLOTATION

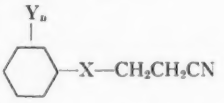
U. S. 2,818,976, issued Jan. 7, 1958 to Thomas H. Lentz and Harold Wittcoff, assigned to General Mills, Inc., describes a process for the treatment of phosphate ore for the separation of phosphate minerals from pulp mixtures containing them in mixture with silica and other impurities.

A small amount of a naphthenic amine is added to the pulp, and the mixture is subjected to a froth flotation process. The silica and other impurities are separated as froth, and the phosphate minerals are recovered in the underflow.

PESTICIDES

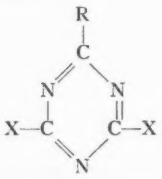
U. S. 2,819,197, issued Jan. 7, 1958 to Philip H. Santmyer and Samuel A. Heininger, assigned to Monsanto Chemical Co., discloses the use of aromatic proprionitrile compounds as nematocides.

The nematocidal compounds have the formula



where X is O, NH, S, or NR; R is alkyl (C1–4), Y is halogen or R, and n is 1–5.

U. S. 2,822,313, issued Feb. 4, 1958 to Kenneth G. Nolan and William B. Hardy, assigned to American Cyanamid Co., discloses new fungicidal compositions, i. e. aryldihalotriazines:



where X is halogen, and R is an aromatic radical (benzene or naphthalene) which may or may not be substituted. ▲

POTATO PSYLLID SURVEY SHOWS POTENTIAL OUTBREAK

Surveys to determine the potential population of the potato psyllid in the southern overwintering areas were conducted during late March 1958.

The Texas-New Mexico area overwintering survey furnishes information to the territory northward, particularly Colorado and Nebraska. Growers in Arizona and California as well as those in Nevada, Utah and western Colorado benefit from the Arizona-California survey. The host plant lycium or matrimony vine is swept with a net to determine the population present.

Eggs were found in the Big Spring-San Angelo, Texas area indicating emergence was not complete. Potential population for 1958 is greater than in 1957 because of abundance of the host and a potential outbreak is indicated for the 1958 season.

Fertilizer Materials Market

FC

New York

April 19, 1958

Sulfate of Ammonia. Supplies are very tight in most sections with some shortages reported as steel producers, because of the low rate of production, were obliged to cut outstanding contracts. This situation will probably remain as it is until the steel production picks up.

Ammonium Nitrate. Certain producers have been disappointed in shipments to date for this season. They are looking forward to a large increase in shipments within the next 60 days.

Urea. A fairly steady demand existed for urea and producers in most cases were in a comfortable position.

Nitrogenous Tankage. Some producers were sold out for shipment over the next three or four months with demand heavy. Prices range from $3.50 to $4.25 per unit of ammonia ($4.25 to $5.16 per unit N) f.o.b. various shipping points. Production was lower at certain plants because of the shortage of raw material.

Castor Pomace. A steady market was maintained for castor pomace and demand has been increasing with last sales made on the basis of $40 per ton, f.o.b. production point. Some imported material was said to be available at southern points.

Organics. Practically all organic fertilizer materials were in a strong current position because of the excellent demand. Blood sold at $6.50 per unit of ammonia ($7.90 per unit N) f.o.b. eastern points and tankage was quoted at $6.75 to $7 per unit of ammonia ($8.20 to $8.51 per unit N) f.o.b. shipping points. Soybean meal for quick shipment was scarce with last sales made on the basis of $60 per ton, f.o.b. Decatur, Ill., in bulk. Cottonseed meal was held at $63 per ton, f.o.b. Memphis in bags for prompt shipment and linseed meal, because of the increased demand from the feed trade, was higher in price.

Fish Meal. The new fishing season will soon be opening up and while producers were asking about $133 per ton for menhaden fishmeal for prompt shipment the demand was slow.

Bone Meal. This material was in a rather tight position for quick shipment, with stocks at most production points exhausted and last sales made on the basis of $65 per ton f.o.b., production points.

Hoof Meal. Offerings were scarce for nearby shipment because production was low and demand heavy particularly from industrial users. Last sales were made on the basis of $6 per unit of ammonia ($7.29 per unit N) f.o.b. Chicago.

Cocoa Shells. Demand has been rather light recently from the buyers and production is low.

Superphosphate. Stocks of both normal and triple superphosphate were reported ample at production points with no price changes noted. Shipments were picking up some, compared to 30 days ago, but the big movement is said to lie ahead as soon as planting gets under way.

Potash. With better weather conditions, producers reported a better movement of potash in most directions. The next 30 days should bring a further improvement in shipments.

Philadelphia

April 19, 1958

Now that Spring seems to have opened up, shipments are well under way, and though the season is almost a month late most shippers are hoping the tonnage demand will catch up to normal. Most materials are in ample supply, with the possible exception of sulfate of ammonia.

Sulfate of Ammonia. This material is now in short supply, due to reduced production of coke-oven grade. Some buyers are turning to ammonium nitrate and nitrate of soda to offset the sulfate of ammonia shortage.

Ammonium Nitrate. The demand is good and prospects for continuance are said to be quite favorable. Deliveries in some areas have been cut considerably by bad weather. The supply is ample and no price changes are suggested.

Nitrate of Soda. The demand has been active due to the shortage of sulfate of ammonia. Prices remain the same and the supply is sufficient.

Urea. The demand has improved and agricultural grade remains listed at $110 per ton.

Blood, Tankage, Bone. Blood and tankage demand is described as fair, with blood listed at $6 per unit ammonia ($7.29 per unit N) in the New York area, and $8 per unit ($9.72 per unit N) Chicago. Tankage remains at $8 per unit ($9.72 per unit N) Chicago, but is somewhat easier at $5.75 per unit ($6.99 per unit N) New York. Bone meal remains at $65 per ton and hoof meal $6 per unit ammonia ($7.29 per unit N) in the West.

Castor Pomace. This still is in plentiful supply and priced nominally at $40 per ton.

Fish Scrap. Market is fairly quiet with the supply not too plentiful in some areas. Scrap is quoted at $126 to $129 per ton, and menhaden meal at $130 to $133 per ton.

Superphosphate. Supplies are fully adequate with movement somewhat improved, and listed at 98 cents per unit APA for triple and 90 cents to 93 cents for normal grade.

Potash. Shipments are reported now well under way and producers fully expect them to keep up for a month or more. ▲

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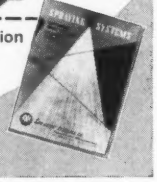

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Alphabetical List of Advertisers

Allied Chemical Corp., New York City
General Chemical Div. — —
Nitrogen Division 41–44
American Agricultural Chemical Co., New York City — —
American Cyanamid Co., New York City 5
American Potash & Chemical Corp., Los Angeles, Calif — —
Armour Fertilizer Works, Atlanta, Ga. — —
Ashcraft-Wilkinson Co., Atlanta, Ga. Back Cover
Baughman Mfg. Co., Jerseyville, Ill. — —
Bonneville, Ltd., Salt Lake City, Utah — —
Bradley & Baker, New York City 22
Bradley Pulverizer Co., Allentown, Pa. — —
Chase Bag Co., Chicago, Ill. — —
Clark Equipt. Co., Benton Harbor, Mich. — —
Clover Chemical Co., Pittsburgk, Pa. 58
E. D. Coddington Mfg. Co., Milwaukee, Wis. — —
Cole, R. D. Mfg. Co., Newnan, Ga. 35
Commercial Solvents Corporation, New York City — —
Davison Chemical Co., division of W. R. Grace & Co., Baltimore, Md. — —
E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. — —
Duval Sulphur & Potash Co., Houston, Tex. — —
Emulsol Chemical Corp., Chicago, Ill. — —
Exact Weight Scale Co., Columbus, Ohio — —
Dave Fischbein Co., Minneapolis, Minn. — —
Flexo Products Inc., Westlake, Ohio 50
Geigy Agricultural Chemicals, New York City 10
Glenn Chemical Co., Chicago, Ill. — —
Grand River Chem. Div., Deere & Co., Tulsa, Okla. 15
Hough, The Frank G. Co., Libertyville, Ill. 2, 3
Hudson Pulp & Paper Corp., New York City — —
International Minerals & Chemical Corp., Chicago, Ill.
Spec. Prod., Phosphate Chemicals Div. 12,13
Phosphate Minerals Div Second Cover
Potash Div. — —
Jackle, Frank R., New York City 57
Johns-Manville Corp., New York City 25
Johnson-March, Philadelphia, Pa. — —
Joy Manufacturing Co., Pittsburgh, Pa. — —
Keim, Samuel D., Philadelphia, Pa. 50
Kraft Bag Corporation, New York City 31
Ludlow-Saylor Wire Cloth Co., St. Louis, Mo. — —
Merck & Co., Inc., Rahway, N. J. — —
Monarch Mfg. Works, Inc., Philadelphia, Pa. 51
Phillips Chemical Co., Bartlesville, Okla. 29
Potash Co. of America, Washington, D. C. Third Cover
Poulsen Co., Los Angeles, Calif. — —
Rapids Machinery Co., Marion, Iowa — —
Richfield Oil Corp., Los Angeles, Cal. 51
Roberts Chemicals, Inc., Nitro, W. Va. — —
Schmutz Mfg. Co., Louisville, Ky. 49
Shuey & Company, Inc., Savannah, Ga. 51
Sinclair Chemicals, Inc., Chicago, Ill. — —
Sohio Chemical Co., Lima, Ohio 32
Southwest Potash Co., New York City 16
Spraying Systems Co., Bellwood, Ill. 58
Stedman Foundry and Machine Co., Inc., Aurora, Ind. — —
Sturtevant Mill Co., Boston, Mass. — —
Tennessee Corporation, Atlanta, Ga. — —
The Texas Company, New York City 26
Texas Gulf Sulphur Co., New York City 19
Thomas Alabama Kaolin Co., Baltimore, Md. 37
Tractomotive Corp., Deerfield, Ill. — —
Union Bag-Camp Paper Corp., New York City 6
U. S. Graphite Co., Saginaw, Mich. — —
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla. 22
United States Potash Co., New York City 9
Velsicol Chemical Corp., Chicago, Ill. 1
Vulcan Containers, Inc., Bellwood, Ill. — —
Vulcan Steel Container Co., Birmingham, Ala. — —
Wis. Alumni Research Foundation, Madison, Wis. — —
Woodward & Dickerson, Inc., Philadelphia, Pa. — —

Buyers' Guide

Classified Index to Advertisers in 'Farm Chemicals'

ALDRIN

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AMMONIA—Anhydrous and Liquor

Allied Chemical Corp., Nitrogen Div., N.Y.C.
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American Cyanamid Co., New York City
American Potash & Chemical Corp., Los Angeles, California
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Buyers' Guide

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American Agricultural Chemical Co., N. Y. C.
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